THE IRUN AGE

A Review of the Hardware, Iron and Metal Trades.

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A New Testing Machine.

During the past ten years the desire for improved testing apparatus has become general. Manufacturers and consumers alike have become awakened to a keen appreciation of the fact that, to economically use material of any kind, it is necessary to have a perfect knowledge of its quality. Within a few years the value of exact knowledge in regard to the quality of iron has become not only desirable, but absolutely essential. Modern inquiry demands of the manufacturer a quality so high, that it is essential to know exactly what grade is produced. Good material also commands so much better price, that the manufacturer much better price, that the manufacturer wishes to be able to recognize the best, in we instake not, the average guaranteed mileage rose within a year from about 45,000 to 60,000 miles, and the average life of car wheels came up in a still greater proportion. The roads became willing to pay for better material, and in the end began to seek for still more durable

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by means of a screw operated by gearing. Hand or steam power may be used for the purpose. The change from one to the other purpose. The change from one to the other may be made instantaneously, by means of the hand lever shown at the right of the main column of the machine in Fig. 1. This lever operates through a set of friction cams, and causes the screw to run upward or downward at pleasure. The weighing is done by means of three beams, coupled in the manner shown in Fig. 1. The central beam is graduated for two poises, one upon the upper and the other upon the lower edge. The smaller poise registers up to 1000 pounds, and the upper from 1000 to 10,000. A suspender rod at the left carries the weights, which are of 10,000 pounds each. The coincidence of the line of strain with wishes to be able to recognize the best, in order that he may in no case lose an advantage. Some years ago the Master Car Builders' Association began the discussion of the mileage of car wheels. The discussions brought together, upon several occasions, the leading manufacturers in the country, and was in the end of very great value in bringing the railroad people to see the necessity of a good wheel. If all the parts, the two guides in which the mileage rose within a year from cylindrical, and fit the guides on the main column of the machine. To secure truth in all the parts, the two guides in which the weighing head moves, and the inside of the sleeve through which the pulling screw is worked, are bored out with the same boring bar and at the same time, thus insuring that their axes are the same. With weighing head and screw both working in the same straight line, it is evident that there is no ten-

only is the latter one-third cheaper, but the only is the latter one-third cheaper, but the American manufacturer makes a study of the island of Cuba, and his plow is consequently perfectly adapted to its requirements. So with heavy machinery on sugar estates; the planters find that, as a matter of course, an article whose prime cost is less, which has less freight to pay, and which is made expressly to suit the island, is preferable to the English one, which does not possess these advantages. In railway plant also the Americans are beating us, for the same objection is raised to the English plant also the Americans are beating us, for the same objection is raised to the English manufactures; rails for instance, of the section required here, have to be rolled ex-pressly in England, so that the purchaser has to give his orders four months in ad-vance, whereas in the United States he finds his rails ready for immediate shipment and cheaper into the bayersin. cheaper into the bargain."

Tramways.

At a meeting of the British Society of Engineers, held on Monday evening, April 21, in the society's hall, Victoria street, Westminster, a paper was read by Mr. J. L. Haddan, on "The Essentials which Should Govern the Construction and Workshould Construc ing of Tramways." The author observed that when tramways were first introduced they were a great advance upon the ordinary roads, but that the modern improve-

SCIENTIFIC AND TECHNICAL.

The Engineer publishes an interesting paper by Mr. Robert Mallet on some CURIOUS PHENOMENA OF REFLECTION,

which, he observes, may give a cue to the which, he observes, may give a cue to the explanation of the magic mirrors of Japan. Many years ago Mr. Reeks, of the London School of Mines, noticed that the image reflected in bright sunlight from a silver coin, which by abrasion of wear had become practically flat, and from which all traces of image and superscription had vanished, was different, in the intensity of the light reflected, from what had once been the field or depressed part and from the head. A silver pressed part and from the head. A silver half crown was struck at the Royal mint showing the Queen's head on the obverse side, but without any design on the reverse face, where a flat surface of polished steel was placed in the coining press in place of the usual reverse die. When this flat and polished side was exposed obliquely to bright sunlight, the reflected image thrown upon a flat surface not only presented with much nat surface not only presented with much distinctness and accuracy the outline of the head, but also a portion of the "Victoria" surrounding it, the head and inscription being shown by a far more brilliant light than the rest. This suggests some interesting inquiries in regard to the flow of metals.

The Techniker mentions

blown through; thus the iron is quickly heated, and kept hot so long as the blast is maintained. If a short interruption occurs, maintained. If a short interruption occurs, it is not found necessary to heat the platinum anew at the other flame.

Mr. M. Winter, of Vienna, has invented and patented in Germany a process for

MAKING ENLARGED PHOTOGRAPHIC REPRO-DUCTION ON TEXTILE PABRICS.

He draws the fabric through a solution of 4 parts by weight of bromide of potassium, I part of bromide of cadmium and 240 parts of water, is such a manner that both sides are thoroughly moistened. Then it is hung up to dry. If the temperature is too low, iodides are added. The dry fabric is then meistened in the same water, with then moistened in the same manner with a solution of 4 parts by weight of nitrate of silver, and 1 part of citric acid in 140 parts of water. The dried fabric is suspended and exposed, with the aid of an electric light, until the picture is clearly visible, which generally will take from 1 to 4 minutes. It generally win take from 1 to 4 minutes. It is then developed in a solution of 10 parts of phyro-gallic acid and 45 parts of citric acid in 410 parts of water, and is finally treated in the ordinary manner with a gold solution, fixed and washed.

Mr. D. N. Carvalho claims to have discovered a riscale related to

covered a simple means of

SHORTENING THE EXPOSURE IN PROTO-GBAPHING,

by painting the whole interior of the studio



Fig. 2.-End View.

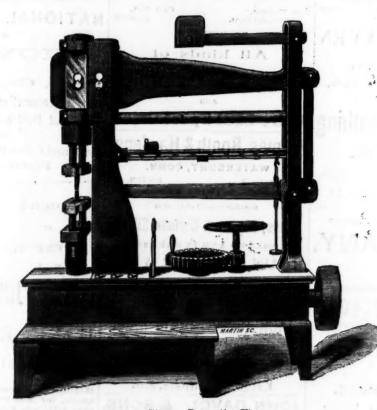


Fig. 1.—Perepective View.

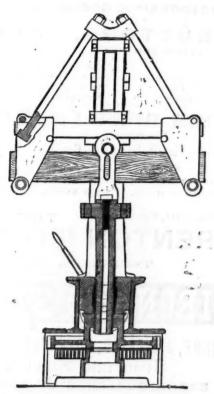


Fig. 3.-End View of Machine Arranged for Transverse Test.

wheels. The effect upon wheel makers was very marked. It was no longer possible to use any iron that would take the proper chill, and, pouring it into a mold, to make a saleable car wheel. An intimate and accurate knowledge of the irons used became necessary. This may be seen from the fact that wheel makers improved their product to such an extent that it would be an advance of the material. When used for transverse test, it will take in specimens from inches long, on the such an extent that it would be an advance Arranged for Transverse Test, and in the present day, which has been discovered by H. Hannosch, of Bernburg, Germany, who calls it "borothe the tramways were superior to the roads, as it has been found that short test pieces do not give a correct indication of the strength of the material. When used for transverse to such an extent that it would be an advance and 12 inches long, to pieces 5 inches such as extent that it would be an advance of the manufacture of which is obviously defect to such an extent that it would be an advance and 12 inches long, to pieces 5 inches such as the latter were sacrificed to the former. The tram rail there, moreover, was available for the moderate ordinary it is claimed to be useful for the preservation of meat. game, butter are continued in possible to reduce exposure for meat product to such an extent that it would be an advance of the manufacture of which is claims by the results of their traffic, while the speed of the trans service of meat. game, butter are continued to produce the former. The tram rail there, moreover, was available for the moderate ordinary is claimed to be useful for the preservation of meat. game, butter are continued to produce the former. The tram rail there are such that it would be an advance of information. It is claimed to be useful for the preservation of meat. game, butter are continued to preservation of meat. game, butter are continued to preservation of meat. game have a present day, which has been discovered by H. Hannosch, of Bern ge, and stipulate for an additional price for each 10,000 miles that they exceeded the for each 10,000 miles that they exceeded the stated figures. Some years ago—even before an improvement in quality of wheels was demanded by the roads—Mr. John L. Gill, Jr., the well-known wheel manufacturer in Pittsburgh, Pa., began the work of accurately testing all the irons used in his establishment. At first this was merely a local or shop matter, but it soon became evident that the testing machines in the mardent that the testing machines in the mar-ket did not work with the uniformity and accuracy desirable. Some three years ago Mr. Gill pointed out to us the fact that two specimens having precisely the same strength might, under very similar circumstances, show wide variations of strength in the same testing machine. To make a machine which would indicate accurately the strain upon the metal, and not by its own action unduly increase or diminish the resistance of the

increase or diminish the resistance of the specimen to be tested, was the problem which he at once undertook to solve.

The testing machine which we illustrate is the result. This machine is designed to obviate the very common danger of pulling the specimens out of line, and so breaking them by tearing or bending them. In this way a specimen may yield to a load much below that which it could sustain if properly applied. The machine has performed most satisfactorily, and has had very high commendation from engineers. Fig. 1 shows the machine in perspective. Fig. 2 is a front view of the same machine when adapted for making test of tensile strength. In Fig. 3 the machine is shown arranged of for making tests of transverse strength. In this cut the lewer portion of the machine adapted for making test of tensile strength.

In Fig. 3 the machine is shown arranged for making tests of transverse strength. In this cut the lewer portion of the machine is shown in section, The strain is applied has no chance against the American, for not traction on tramways generally.

not give a correct indication of the strength of the material. When used for transverse tests, it will take in specimens from 1 inch square and 12 inches long, to pieces 5 inches wide by 8 inches deep and 48 inches long, which is the size of the piece of timber represented in Fig. 3. These machines have worked with so much accuracy and their preference has attracted as much attention. preformance has attracted so much attenon, that Mr. Gill is now manufacturing

American Competition with English Manufacturers in Cuba.

The English Consul-General in Cuba, Mr Cowper, in a recent report to the govern-ment, warns English manufacturers against ment, warns English manufacturers against the growing activity of American exporters."
"The English," he says, "are becoming less and less interested in the commerce of Cuba each year, and the United States more and more so. Machinery and hardware, in which we were once unapproachable, are falling into the hands of our rivals, the only remnants being a limited import of catlery. remnants being a limited import of cutlery and large pieces of machinery, such as and large pieces of machinery, such as steam plows, sugar engines, &c.; but even these, from various causes, are now coming from other countries, notably the beautiful machinery from France, such as centrifugal machinery from France, such as centrifugal machines, vacuum pans, and those connected with distilling. One of the largest imports from England was the large cane knife, or machete; some of these are still imported from England, but the fact cannot be, and is not, disguised from the buyers that these knives are inferior to those made in the United States and in Germany at coula prices. The only advantage pos-

former. The tram rail there, moreover, was available for the moderate ordinary traffic, while the speed of the train service was about 20 per cent. greater than in this country and on the Continent. Mr. Haddan alluded to the general tendency to employ wood in roadways, and he described a system of construction by which a road could be made with a perfectly flat surface and yet be well drained, and which should have the tramway incorporated with it. The tram rails, he said, would be of wood, and the roadway would be kept surfaced with grit, so that the wood would not form the actual wearing surface. This system of tram and roadway, the author observed, would be homogeneous, and would observed, would be homogeneous, and would combine the best pessible road for ordinary vehicles, with a perfect tramway for special carriages, at less cost than the present method of construction. The author con-demned the indiscriminate introduction of demned the indiscriminate introduction of railway and omnibus principles into the construction and working of tramways, and described his proposed arrangement for meeting the requirements of a tramway service. This consists of a locomotive engine, to be worked by steam and air, the steam being used for compressing, during the journey, its own supply of air, as well as that which supplies the continuous motive power for propelling the cars. By reversing, the same driving mechanism acts as a continusame driving mechanism acts as a continu-ous brake, and the same system is so ar-ranged that the driver constantly feels the pull of the train upon a regulator handle. The withdrawal of his hand from this handle is to instantly cause the steam power to block the train. Thus the brake mechanism would always be in action, instead of lying dormant as in ordinary continuous brakes.
The author, in conclusion, stated what in his opinion were the technical, physical and administrative requirements of mechanical

light which has been so thoroughly tested and condemned as too expensive in Paris, London and elsewhere, has brought out

A NEW ELECTRIC LAMP

from the construction of which it would seem that he has abandoned the voltaic arc and joined the admirers of the incandescence principle. His new construction simply consists of a bifurcated holder, besimply consists of a bifurcated holder, between the two arms of which a small strip of porcelain is clamped. Below it is an induction coil. A small strip of metal is attached to the lower portion of the porcelain plate. The incandescent porcelain, it is claimed, yields a beautiful, subdued light, while at the same time it is but slowly consumed.

A simple apparatus has been devised by Dr. Paquelin, of Paris, for

arrangement of which is not stated, is placed by the workman in a side pocket of his coat. He connects it with two caout-chouc tubes, one of which goes to the soldering tool, the other to a small caoutchouc balloon lying on the ground. By treading on the balloon, air is forced through the box, and therein becomes charged with petroleum vapor. The soldering tool itself is hollow, vapor. The soldering tool itself is hollow, and into it projects, at the fore end of the handle, a platinum point, through which the air, charged with hydrocarbon, is blown

DECOLORIZING YELLOW DIAMONDS.

which is attributed to M. C. Ribaltier. It which is attributed to M. C. Ribaltier. It consists simply of operating with closed vessels excluding the air, instead of using open crucibles, as has been done hitherto. The diamonds are packed into chemicals generally employed for the purpose, and are heated in furnaces similar to those used for the precious metals. An important point to be observed is to cool the furnace down very gradually. If this is done, it is claimed very gradually. If this is done, it is claimed that the surface of the diamonds is not affected in any way, nor do they lose any of

The Metric System and the Board of Trade.—The monthly meeting of the Board of Trade and Transportation was held recently. On motion of Mr. Thurber, a series of preclations exercises. HEATING SOLDERING IRONS
with a gas blow-pipe flame. A metallic box of the size of a thick book, and the inner ing the appointment of committees by careful and Transportation was held recently. On motion of Mr. Thurber, a series of resolutions asserting the superiority of the metric system to that now in use, urging the appointment of committees by careful and transportation was held recently. ing the appointment of committees by every commercial organization in the country for the purpose of securing its ultimate adop-tion, and providing for the appointment of a special committee by the board to that end, were unanimously adopted.

The Saginaw Mining Company, Lake Superior, have leased the Hamilton and Merryman mining property adjoining the Norway, on which considerable exploring has been done, and have commenced mining. into the interior of the iron in fine current. It has been fully and satisfactorily detormencing work the platinum point is first brought to a glow in a neighboring spirit lamp; it inflames the gas mixture of hard, steely ore,

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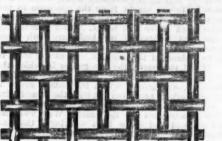
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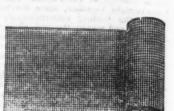
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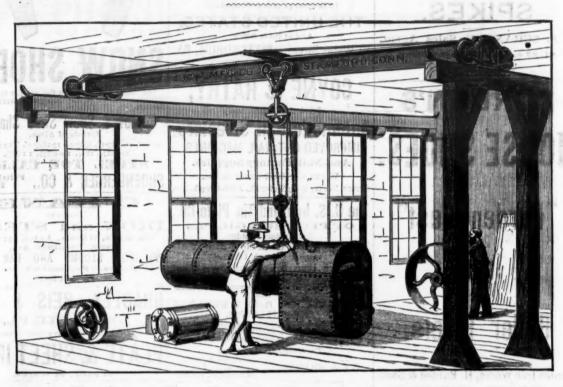
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The cornice business, particularly since the war, has been more of a Western than an Eastern industry. The reasons for this are several. Immediately following the war building interests throughout the West were stimulated to the utmost, and all new ideas in building which promised fair results were eagerly seized upon and put into practice. Galvanized ironwork, which has a preposessing appearance, naturally became very popular, and was employed upon all kinds

held among those of the West.

Still other reasons may be given for the prosperity of the trade in the West, as contrasted with its condition in the Eastern part of the country. The character of the buildings which are popular in the Western States, is much more favorable to the liberal

workmen produces these copies, while another set shapes them, a third joins them by soldering and riveting and a fourth packs and ships, while a fifth attends to putting up at the building. Of course, such a system can be profitably maintained in a very large business; yet several of the largest concerns in the trade make no attempt at it. The advantage which their competitors possess over them, arising from this alone, is quite marked.

In small shops division of labor, up to a

stimulated to the utmost, and all new ideas in building which promised fair results were eagerly seized upon and put into practice. Galvanized ironwork, which has a preposessing appearance, naturally became very popular, and was employed upon all kinds of buildings. It was accepted unhesitatingly for almost all purposes, and it soon became the favorite decorative material—a position which it has held almost without challenge until a very recent time.

Before the war galvanized ironwork had been introduced and quite extensively used in New York and in some of the other Eastern cities, but the high price of iron, together with the general interruption of building interests at the commencement of the rebellion, served to destroy the business as it then existed, and its recovery at the close of the war was very slow. As an industry, the cornice business was in the full tide of prosperity in the West before it showed any signs of revival in the East, and at no time has it taken the strong position among Eastern builders that it has long held among those of the West.

Still other reasons may be given for the same mather and the purpose. Men are the best suited for operating a large brake, but boys can use a small one successfully. Similar comparisons may be made with respect to other parts of the labor employed in cornice shops.

Our engraving shows a practical example of the working of a system of division of labor. It illustrates the method of managing small forming, in use in several of the

Our engraving shows a practical example of the working of a system of division of labor. It illustrates the method of managing small forming, in use in several of the Western shops, and which gives very satisfactory results. Two boys, or two sets of boys, according to the extent of the business, are required, as shown in the cut. One is constantly employed at the brake in



CORNICE MAKING .- DIVISION OF LABOR IN SMALL FORMING.

use of galvanized iron than of those erected in the East. The taste of the people approves the use of galvanized iron in the lone case, and opposes it in the other. With due deference to the Western people, we may say that in general they are fond of display in their buildings, and are pleased with striking features of design, to an extent which causes them to give more attention to the general appearance of an edifice than to the materials of which it is constructed.

Besiden The bends, while the other makes the forms, by means of different sized formers conveniently arranged in the edge of a bench for the purpose. The work comes to them cut and pricked, so that they have nothing else to do than to give it the proper shapes and deliver it to the solderers. Being thus constantly employed upon one thing thus constantly employed upon one thing they soon become very expert, and produce not only better work, but much more of it, than if continually changed about from one job to another. which causes them to give more attention to the general appearance of an edifice than to the materials of which it is constructed. Perhaps we should qualify this by saying that formerly such was the case, for unthat formerly such was the case, for undoubtedly a change has taken place; and the fact that more attention is now paid to the construction employed in buildings, and that the fitness and appropriateness of materials are more carefully considered, is probably the reason why the cornice business is not so thriving in the West at present as it was some time since. There are fewer store fronts made entirely from galvanized iron in imitation of stonework now than formerly, and upon public buildings—courthouses, jails, school-houses and the like—the use of galvanized iron is at present restricted to cornice, roof and tower trimmings, &c., rather than extended to embrace pilasters, quoins, window caps and sills, belt courses and other parts of the wall finish, which in the past has been a common practice. ommon practice.

common practice.

In the East galvanized iron has seldom, if ever, been used as a substitute for stone. The esthetic taste of architects and builders has been opposed to the employment of a hollow shell as for a belt course, or wherever solid stone was demanded by the principles of construction. Servile imitation, a term which has been used against galvanized ironwork quite freely by its enemies, has never been merited in the East. The taste and good sones of the neonly have restrained. and good sense of the people have restrained them from the too free use of this class of work, and, as a consequence, have kept the business within narrower limits than it has found elsewhere.

found elsewhere.

The corresponding effects upon the trade in these sections of the country have been very marked. While at present the shops in the West are very generally experiencing a decline in the demand for cornice work, incidental to a reaction in the minds of the incidental to a reaction in the minds of the people, the shops in the East are kept comfortably busy. The Western shops built and equipped for the extensive trade which existed some time since, now find less to do than occupies their full capacity, while those in the East are fairly employed, they being no larger than existing demands serve to

The system of manipulation in cornice making differs materially between different making differs materially between different shops. In some a careful division of labor exists, while in others there is no attempt made at classification. The distinctions in this respect are not at all sectional, but are dependent upon the genius and methods of the managing men in the various establishments. In some shops distinct departments are maintained. A draftsman prepares the detail drawings. A pattern cutter gets out the patterns and marks upon them the number of duplicate pieces required. One set of

job to another.

The arrangement of formers, which is

Underground Telegraphy.—It is stated that the purchase of the patent right for a system of underground telegraphy has been consummated, in Philadelphia, between the Western Union Telegraph Company and David Brooks, the patentee. The patent consists in insulating telegraph wires in cotton, laying the whole in a wrought-iron pipe filled with petroleum. This is done to protect the wires from the moisture of the ground. Experiments have been made with this system by the Pennsylvania Railroad Company, which has used it in its block signalings with marked success. The wires incased in pipes were laid in trenches beside he track. he track.

The rolling mill at Reading, Pa., owned by The rolling mill at Reading, Pa., owned by the Philadelphia and Reading Railroad Company, is using old car-wheels, which are made of charcoal iron, instead of pig iron in puddling, for the heads of rails. Mr. W. E. C. Coxe, superintendent, says, in a recent letter to the secretary of the Iron and Steel Association, that all the rails made at the above-named mill are now made in this way, whether under contract for re-rolling or for

The Board of Health of Carlsruhe, Baden, The Board of Health of Carlsruhe, Baden, publishes a notice stating that chemical analysis shows that the outer portions of the packages of American canned beef which have been in contact with the tin of the case, are impregnated with lead, and are injurious to health. Consumers are advised to cut off a thin paring on all sides of the package before using the meat.

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N. H., assignor of one-fourth his right to
Erastus Dacy, same place.—Feb. 18, 1879.—
1. The cylindrical tumbler for locks, the exterior surface of which is formed in rings
or portions having different diameters, with
recesses at the opposite sides thereof, and
having the keyhole and bolt-throwing finger,
as set forth.

as set forth. 2. In combination, the revoluble keyhole tumbler, provided with peripheral recesses, and the guard plate or plates, provided with oppositely projecting points or lugs, cor-

The combination of a tubular water or steam conductor, A, and a transparent tubu-lar section, B.

3. The combination of a main tubular water or steam conductor, A, and a trans-parent branch or switch tubular conduc-

tor, B.
4. The combination of a tubular water or team conductor, A, a transparent section of steam conductor, A, a transparent section of tubing, B, a thermometer, C, and a checkvalve, E.

valve, E.

209,539.—Hot, Cold and Waste-Water Cocks.

—W. D. Abbatt, West Chester, N. Y.

—Nov. 5, 1878.

209,763.—Revolving Pooket Hand Stamps.—

Wm. H. Keeler, Buffalo, N. Y.—Nov. 12,

209,774.—Screw Cutting Dies.—Ole Pederson, Joliet, Ill.—Nov. 12, 1878.



3. In combination, the tumbler cylinder C, provided with peripheral recesses and finger C⁴, the guard plate D, with oppositely projecting lugs D¹ D² and stop-lug D³, and the bolt B, with stop B¹.

4. In combination, the tumbler cylinder C, with surfaces of various diameters, recesses d d' and finger C⁴, the extensible key F, the guard plates D, with guards or points D¹ D₂ and lug D³, the springs E and bolt B b, with stops B¹.

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FURNACE FOR ROASTING ORE.

212,508.—To Charles E. Robinson, Brooklyn, N. Y.—Feb. 18, 1879.—1. The process of roasting pulverized ores, consisting in subjecting a charge of the same to the simultaneous

responding in size and position with said recesses, and distant from each other equal to the diameter of said tumbler.

3. In combination, the tumbler cylinder C, provided with peripheral recesses and finger C⁴, the guard plate D, with oppositely of the cover imparts a lead or clearance to projecting logs. D¹ D² and stop-lug. D³ and the lin of the cutter. the lip of the cutter.

209,584.—Combined Heater and Feeder for Boilers.—Rufus N. Pratt, Hartford, Conn.

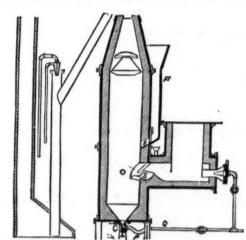
—Nov. 5, 1878.

209,899.—Steam Boilers.—Luther Knight, Arlington, Vt., assignor of one-half his right to William C. Allen, Cambridge, N. Y.—Nov. 12, 1878.

The ends of all the heating tubes are con-

centrated in the end extension of the boiler, by which all the water is made to pass tyn, N. Y.—Feb. 18, 1879.—1. The process of roasting pulverized ores, consisting in subjecting a charge of the same to the simultaneous action of a jet of flame and of a jet of air, steam or gas introduced underneath the charge, whereby the particles of ore are kept in continual suspension and agitation during the whole operation.

2. In combination with the cupola, the



air, gas or steam jet pipe or pipes G, the jacket F, and the discharge aperture g.
3. In combination with the base of the cupola, having a discharge aperture, the pivoted horizontally swinging gate C, the rigid jet pipe G, and flexible connecting piece g.

piece p.

4. The combination, with the fuel chamber and cupola, of the salt pocket and feed

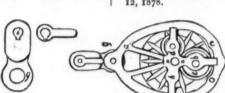
TACKLE BLOCK. 212,566.—To Joseph W. Norcross, Boston, Mass.—Feb. 25, 1879.—I. The combination, with the sheave axle a and disks e and f, of the frame b, cast in one piece with the

The bolt carries the tumblers, and they are held in position by a slight frame and springs.

209,845.—Machines for the Manufacture of Horseshoe Nails.—Job Whysall, jr., and Charles M. Merrick, New Brighton, Pa.— Nov. 12, 1878. 209,898.—Smoke Consuming Devices for Furnaces.—William M. Kirby, Pittsburgh,

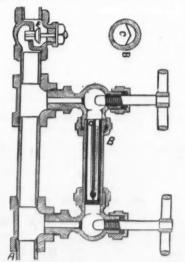
Pa.—Nov. 12, 1878.
209,782.—Manufacture of Auger Bits.—
James Swan, Seymour, Conn.—Nov. 12,

209,913.—Gage-Cocks for Steam Boilers.— Horace R. Morse, Concord, Ohio.—Nov. 12, 1878.



INDICATOR FOR WATER-SUPPLY PIPES OF STEAM BOILERS.

212,758.—To Charles Sprod, Philadelphia, Pa.—Feb. 25, 1879.—I. The combination,



with a tubular water or steam conductor Best Cake for Furnace and Foundry Use. | A, of a transparent section of tubing, B, and thermometer C.

2. The combination, with the block, of the lock shackle, consisting of the eye g, the slot A, hole i, and locking bolt, provided with the spring arm and groove.

INDICATOR FOR WATER-SUPPLY PIPES OF STEAM BOLLERS.

209,921.—Lanterns.—Elias B. Requa, Jersey City, N. J.—Nov. 12, 1878.—Percival Everitt, Great Ryburgh, assignor of one-half his right to Frank Wheeler & Co., London, England.—Nov. 19, 1878.—Patented in England.—Nov. 19, 1878.—Patented in

England, April 16, 1878. 210,127.—Saw Swages.—Simon Kinney, Bay City, Mich., assignor of one-half his right Chauncy Spearin, Chicago, Ill.-Nov.

19, 1878. REISSUES.

492.—Calendars.—C. W. Bryan, Spring-field, Mass., assignor, by mesne assignments, to Clark W. Bryan and Jesse F. Tapley, same place. Patent No. 62,313, dated Feb. 26, 1867; antedated Dec. 11, 1866; reissue No. 3306, dated Feb. 23, 1869.—Nov. 19, 1878. REISSUES.

1809.—Nov. 19, 1878.

1. A calendar constructed of several superposed printed sheets, attached together at one edge, whereby the several sheets may be successively and easily removed.

2. A calendar constructed of several printed sheets attached to head piece.

3. A calendar constructed of several super-posed printed sheets atta hed to a head piece,

posed printed sheets acta had to a head piece, and having attached to last of said sheets a counting-house calendar.

1649.—Steam Boilers.—Jos. Firmenich and Flavius P. Stiker, Buffalo, N. Y., assignors to Jos. Firmenich, George Firmenich and

Frank Firmenich, same place. Patent No. 169,977, dated Nov. 16, 1875.—Nov. 19,

1878. 405.—Sap Spouts.—J. B. Sargent, New Haven, Conn., assignor, by mesne assign-ments, to Charles C. Post, Burlington, Vt. Patent No. 76,530, dated April 7, 1868, Nov. 19, 1878.

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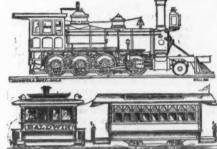
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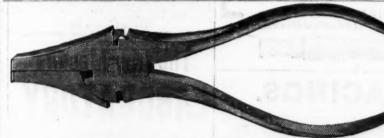
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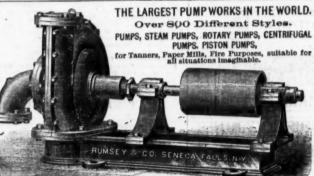
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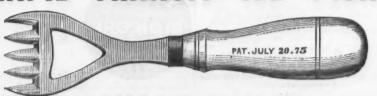


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Much of the superior excellence of the work made by American mechanics and machinists in a surprisingly short time, is admittedly due to their adherence to the principle of using good tools only, and, while they make exacting demands upon them, they show a correct appreciation of their value, and are quick to perceive and determine the advantages and disadvantages of any novelty presented to them. This is well understood by inventors and manufacturers, who are unceasing in their efforts to anticipate the wants of the workshop. A recent tool, brought out for the general use of mechanics and machinists, are the Reliance Wrench Tongs, the construction of which will be readily understood by referring to the accompanying illustration. A thread is cut upon the main stem of the wrench or tongs, upon which a sleeve, with a corresponding thread, can be moved up or down. It is by means of this movable sleeve that the tongs are adjusted to any size of pipe, nut, &c. The adjustable jaw is cast with a lever, which allows the stem to pass through it and enables the operator



RELIANCE WRENCH TONGS.

to take a secure grip. When using the tongs the lever is thrown out a little from the handle, and the sleeve is adjusted until the movable jaw engages the pipe. If the lever is then forced toward the handle again the jaw takes a firm hold on the pipe, owing to the shape of the collar at the end of the sleeve. Force applied to the handle in one direction will only have a tendency to push the jaw against the stem, and thus keep the the law against the stem, and thus keep the lever in place; if reversed, it throws the lever out and slips back, like a racket, for a fresh grip. By reversing the position of the tongs on the pipe it can, of course, be made to tong either year. to turn either way.

All the parts are made of cast steel, except the handle, which is a malleable casting riveted to the stem. The adjustable jaw and the sliding sleeve are both hardened. The tool is applicable to pipe, bolts and nuts. The lever is always at the same distance from the handle, whatever the size of the pipe, so that the inconvenience of grasping two handles wide apart is avoided. These WROUGHT-IRON FENCING
For public and private use.

Automatic Carriage Cates

Celluloid.

Although celluloid was invented nine or

in direct contact with flame. When crude it looks like a transparent gum, and its color is a light yellow-brown. It can be made as hard as ivory, but is always elastic, and can be readily molded into every conceivable form. With equal ease it can be colored in any tint desired, the dye running through the entire substance, and being, therefore, ineffaceable.

All the celluloid made is produced by a foreign single company, with factories in Newark,

N. J. This company makes only the raw material, which it sells to various manufacturing companies for so much per pound and a royalty on their net sales. No one can buy it unless the producing company decides to give him a license, which is granted only for the purpose of making some new article that will not interfere with the trade of the companies already licensed. A number of large corporations are now engaged in the various branches of manufac-

A number of large corporations are now engaged in the various branches of manufacture for which celluloid can be employed.

The coat of the crude article to the buyers is regulated by the producing company according to the use to be made of it and the competition met with in other materials. For instance, \$4 or \$5 per pound are charged for celluloid which is to be made into jewelry, while only \$2 are charged if it is designed for umbrella handles, though there is no difference in the quality of the sub-

designed for umbrella handles, though there is no difference in the quality of the substance. In consequence of this system there is a similar wide variation in the cost of the manufactured articles.

As a close imitation of ivory, celluloid has made great inroads in the business of the ivory manufacturers. Its makers assert that in durability it is much superior to ivory, as it sustains hard knocks without injury, and is not discolored by age or use. Great quantities of it are used for piane and organ keys, to the manufacture of which Great quantities of it are used for piano and organ keys, to the manufacture of which one company is devoted. So extensive is its use for this purpose that the ivery manufacturers have reduced their price for keys below that of celluloid, in the hope of checking the competition. "It is only a question of who can hold out longest," said a celluloid manufacturer; "but we can make our own elephants, and the ivery men have got to catch theirs."

Billiard halls are made of celluloid at half

Billiard balls are made of celluloid at half the price of ivory, and are said to be equally elastic, while more durable. Large amounts are used for combs of every variety, for the backs of brushes and hand mirrors, and for all kinds of toilet articles which ivory is employed for. Even a fine-tooth comb made of celluloid is 25-per cent. cheaper than ivory, while in large pieces, such as the backs of hand-glasses, the difference in price is encrmous. Among many other articles in which celluloid takes the place of ivory or india-rubber, are whin cape and unbrelle. which celluloid takes the place of ivory or india-rubber, are whip, cane and umbrella handles, every kind of harness trimmings, foot-rules, chessmen and the handles of knives and forks. Its use in cutlery is said to be especially desirable, as it is not cracked or discolored by hot water.

India rubber, as a general rule, holds its ground against celluloid, as the latter cannot be sold so cheaply. The celluloid is said to be much more durable, however, and it is superior for pencil cases, invelve the

superior for pencil cases, jewelry, &c., where gold mountings are used, as it does not tarnish the metal, whereas the sulphur not tarnish the metal, whereas the sulphur in india rubber tarnishes gold which is less than 18 carats fine. The freedom of celluloid from sulphur, and the natural flesh color which can be imparted to it, have caused it to be extensively substituted for india rubber in the manufacture of dental blanks, or the gums and other attachments of artificial teeth.

of artificial teeth.

Celluloid can be mottled so as to imitate the finest tortoise-shell, and its elasticity renders it much less liable to breakage. In this form it is used, like the imitation ivory, for combs, card cases, cigar cases, matchboxes, pocketbooks, napkin-rings, jewelry and all sorts of fancy articles. The substance is employed for similar purposes as a good imitation of malachite and also of amber. It is made into mouthpieces for amber. It is made into mouthpieces for pipes, cigar-holders and musical instruments, pipes, cigar-holders and musical instruments, and is used as the material of flutes, flageolets and drumsticks. For drumheads it is said to be superior to parchment, as it is not affected by moisture in the atmosphere.

As a substitute for porcelain, celluloid is used for the heads of dolls, which can be hammered against a hard floor without danger of fracture. Beautiful jewelry is made of it in imitation of the most elaborately-carred coral, reproducing all the shotle.

ately-carved coral, reproducing all the shades of the genuine article. Most of the coral of the genuine article. Most of the cori I
tints are bright or dark red, however, as the
makers, strange to say, have found that
excellent copies of the costly pink coral are
not in popular demand.

One of the large manufacturing companies

is employed exclusively in the making of optical goods, using celluloid in place of tortoise-shell, jet, &c., for the frames of spectacles, eye glasses and opera glasses. The material is extensively used for shoe tips, protecting the toe as well as metal tips, and having the appearance of patent leather. By shoemakers it is also used for insoles. Large quantities of thimbles are made of it, and it is said to be the best material known for emery-wheels and knife-sharpeners. As a ground for paintings, celluloid has all the advantages of ivory, and photographs can be taken on it which are alleged to be supposed to ivorythres.

superior to ivorytypes.
Within the last year and a half another branch of celluloid manufacture has been developed which promises to reach enormous developed which promises to reach enormous proportions. This is the use of celluloid as a substitute for linen or paper in the making of shirt cuffs, collars, &c. It has the appearance of well-starched linen, is sufficiently light and flexible, does not wrinkle, is not affected by perspiration, and can be worn for months without injury. It becomes soiled much less readily than linen, and when dirty is quickly cleaned by the application of a little soap and water with a sponge or rag. For travelers and for wear in hot weather, this celluloid linen is especially convenient. It has lately been much improved by the introduction of real linen between two thicknesses of celluloid. Shirt-Although celluloid was invented nine or ten years ago (by two brothers named Hyatt), its perfected manufacture has been regularly in progress for only about five years, and is considered to be still in its infancy; yet immense quantities of the substance are produced; it is converted into a wonderful variety of forms, and new modes of applying it are discovered almost daily. Celluloid is a composition of fine tissue paper and camphor, treated with chemicals by a patented process. A rather common impression that it contains gun-cotton is a mistake, which arises from confounding it with collodion. Celluloid, it is said, is entirely non-explosive, and burns only when in direct contact with flame. When crude it looks like a transparent gum, and its color

foreign company, which has a factory in



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gers, Long Rafting Solid Cast-Steel Augers, Coopers' Doweling Bits and Boat-Builders' Bits, And all kinds of Machine Bits made to order.

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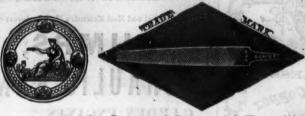
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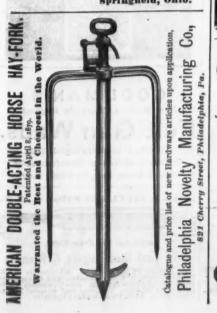
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PARIS EXPOSITION.

THE EXHIBIT OF IRON AND STEEL,

An Abstract of the Report by the Hon Daniel J. Morrell, Commissioner to the Paris Exposition from the United States.

(Concluded.)

AUSES OF THE UNIVERSAL BUSINESS DE-

Leaving the Paris Exposition, I now turn to a consideration of the present condition of the European iron and steel industries. First, however, it is proper that some notice should be taken of the present industrial condition of all countries which are largely devoted to manufactures.

That the manufacturing industries of

leading European countries, as well as of the United States, have been depressed for many years is news to no reader of this report. Europe being more exclusively devoted to manufactures than the United

States, and having a dense population, has suffered the most from this depression.

The inquiry is naturally suggested whether the universal depression has been created by the numerous wars of the past few years. Undoubtedly these wars influenced unfavorably the manufacturing industries of many ably the manufacturing industries of many countries, by first partially arresting their healthy activity and afterward unduly stimulating their development. In the United States, Austria and Germany, this forcing of manufacturing activity was accomplished largely through the influence of an increase in the currency, itself a result of war, but neither the recent were now of war: but neither the recent wars nor or war; out neither the recent wars nor the inflation of the currency which accom-panied some of them will sufficiently account for the depression and distress with which the civilized world is to-day so familiar.

First among additional causes may unquestionably be placed the influence of machinery in cheapening and increasing manufactured products. By means of the mechanical inventions of the past 20 years manufacturing nations have attained a production of the past 20 years manufacturing nations have attained a production. manuacturing nations have attained a productive capacity in excess of the consumptive capacity of both civilized and half-civilized nations. This development of manufacturing facilities would have taken place if there had been no wars.

Next among the causes of world-wide de-pression must be placed the slackening of the pression must be placed the slackening of the demand for new railroads. For a period of about 10 years prior to 1873 all of the leading countries of the world, and many of the second and third-rate countries, were actively engaged in building railroads to afford means of communication between the several parts of their territories or to develop their latent resources. In 1873 and immediately succeeding years it was found that as many of these railroads had been constructed as were required by the necessities of the countries building them, or as they were able to pay for, or could borrow money to pay for, and with the total or partial cessation of the demand for new railroads, a check was atonce given to all the roads, a check was at once given to all the industries which had been built up or en-larged in expectation of a continuance of

To show how rapidly the iron industry alone was developed in the years imme diately preceding the beginning of the pres-ent depression, I give the statistics of the world's production of pig iron in each of the years 1855, 1872, and 1873, as follows: 1855, 6,889,906 English tons; 1872, 14,470,-358 tons; 1873, 14,706,459 tons. In 1873 358 tons; 1873, 14,706,459 tons. In 1873 production reached its maximum, and since then it has steadily declined, the figures given in the beginning of this report showing a present annual production of only 13,807,-

725 tons.

While the fever for building railroads was everywhere at its hight, another influence was actively at work to assist in destroying the prosperity of the iron industry by destroying, to a large extent, the demand for iron itself. A revolution involving the general substitution of steel for iron had been commenced, and so received. been commenced, and so popular did it be-come that all the leading countries were soon engaged in promoting it. The new processes not only rendered useless hundreds of iron establishments which had been called of iron establishments which had been called into existence by the wants of new railroads and the exigencies of war, but they gave to the world products of greater durability than iron at approximately the same cost, thus decreasing the demand for iron ore, coal, and other raw materials which are common to the manufacture of both iron and steel. They did more than this; they almost wholly destroyed the large demand that had existed for years for finished iron and for heavy iron machinery for the comand for heavy iron machinery for the con-struction of blast furnaces and iron rolling

mills. These four causes of depression have oper ated with almost equal force in countries en-gaged in war and in countries which were not so engaged—in countries which had an inflated currency, and in countries which did not have it—in countries largely engaged in manufactures, and in countries only slightly engaged in them. But of all the countries visited by the hard times of the past few years those least injuriously affected, and possessing to-day the brightest prospects for a industrial future are the two which have an industrial future, are the two which have most protected their home industries—the two great republics, France and the United States.

PRESENT CONDITION OF THE EUROPEAN IRON TRADE

After the Austrian panic of 1873 the building of railroads in the Austrian Empire received a severe check, the production of pig iron and iron rails materially declined, and the imports of all iron and steel also pig iron and iron rails materially declined, and the imports of all iron and steel also greatly declined. The Bessemer steel industry of Austria has been very slowly developed, but its development has almost sufficed to destroy the Austrian iron rail trade. In 1878 the country had not recovered from the depression which began in 1872.

in 1873.

The results of the business depression have been far more disastrous in Germany than in Austria. For about two years after the close in 1871 of her war with France, Germany was presperous. Labor was in demand, and wages and prices advanced. But in 1873 symptoms of a decided reaction were manifested, and in that year the pros-

perity of the German iron and steel industries culminated, and it has since continued steadily to decline. This reaction would not have been so severe as it has been if the have been so severe as it has been if the German government, in an excess of generosity which is unaccountable, had not at the beginning of 1877 removad all duties on foreign iron and steel, thus increasing the severity of foreign competition at a time when domestic manufacturers of iron and steel were struggling with other causes of trade depression. The depression in all manufacturing industries was supposed to be at its hight in 1878. Many workmen were unemployed, and the general distress was very great, but this the government was endeavoring to alleviate.

The wonderful recuperative power which France displayed after the close of the war with Germany was illustrated in the revival of her iron and steel industries, but of late much difficulty has been experienced in maintaining the steel as well as iron establishments of France in generation and but for the

much difficulty has been experienced in maintaining the steel as well as iron establishments of France in operation, and but for the strongly protective policy of the country, which has many forms, the difficulty would have much increased, and financial and social distress would have been general. Notwithstanding the help of the government, however, many iron and steel works of France, chiefly iron rail mills and blast furnaces, were not employed in 1878. A French journal which is recognized as an authority stated, at the beginning of 1878, that "production is beyond consumption; production has been too rapid, and must wait until an equilibrium has been established." It is worthy of note that the French iron and steel and other industries were not stimulated into activity by an inflated currency, as was partly the case in Austria and Germany, but that they have reached the point of development stated by the French journalist in deflance of a positive contraction of the currency, resulting from the payment of the heavy indemnity to Germany.

The Belgian iron and steel industries

from the payment of the heavy indemnity to Germany.

The Belgian iron and steel industries were not so generally depressed in 1878 and immediately preceding years as those of Austria, Germany or Great Britain. With a great effort, and with the help of orders from the Belgian government itself, nearly all of the iron and steel works of the kingdom, with the exception of blast furnaces, were kept in operation, although many were not operated to their full capacity. It has been partly through frequent reductions in wages that the Belgian ironmasters have kept their works in fair activity, and have been enabled, as has been officially stated by the secretary to the British Legation at been enabled, as has been officially stated by the secretary to the British Legation at Brussels, "to buy pig iron in England, pay for freight, and deliver the same iron, manufactured into beams and girders, in the most central parts of England, or even in the heart of the iron districts, at a lower price than it can be made by English firms

on the spot."

The iron and steel industries of Russia have not suffered from overproduction, as they have not in late years fully supplied the home market.

home market.

There have of late been many financial
failures in the ranks of Swedish iron and
steel manufacturers, and many works have steel manufacturers, and many works have been closed. I can see but little prospect for an improvement in the Swedish iron and steel industries, and none whatever so long as the Swedish tariff remains as it is. The tide in the prosperity of the British iron and steel industries has ebbed with the refusal or inability of other countries to buy British iron and steel in the large countries

British iron and steel in the large quantities that were a few years ago required. The exports of these products have steadily declined. As a result of this decline, many of her blast furnaces and rolling mills have been closed, and not a few of their owners have been bankrupted. The iron rail trade of Wales and Cleveland has been pronounced by British writers to be "dead." The struggle for existence is so severe in the British pig iron trade that the Cleveland ironmasters have made serious inroads upon the pig iron trade of Scotland, having sup-British iron and steel in the large quantities ironmasters have made serious inroads upon the pig iron trade of Scotland, having sup-plied Scotch consumers with 303,176 tons in 1878, and it is announced that they "are prepared to make further sacrifices to keep up the deliveries into Scotland."

Nor is the Bessemer steel manufacture of Great Britain prosperous. It is suffering to-day from over-production. In destroying the British iron rail trade it is not clear that it has not commenced to prey upon itself.

it has not commenced to prey upon itself.
Competition between the owners of Bessemer establishments have been virtually closed. One result is certain to follow the severe struggle that is now in progress in Great Britain: not only iron rails, but also all forms of manufactured iron, even crucible steel of British manufacture, must be driven more and more from British and foreign

In the undue development of British manufacturing industries and in the subsequent misfortunes which have overtaken them an inflated currency has had no part, and until recently a protective tariff has had no friends.

THE PRESENT CONDITION OF LABOR IN EUROPEAN COUNTRIES.

Inseparably connected with the condition Inseparably connected with the condition of the iron and steel and other manufacturing industries of Europe is the condition of European labor. In proportion as these industries have been depressed, so has labor lost its opportunities or gone without sufficient reward. The number of the unemployed and of these whose ways recarries. cient reward. The number of the unemployed, and of those who earn a precarious subsistence in employments to which they are unaccustomed, is in most European countries larger than has been known for many years, and is especially large in Germany and Great Britain. But for the main tenance on the Continent of large standing armies, which withdraw many thousands of skilled and unakilled workingmen from comarmies, which withdraw many thousands or skilled and unskilled workingmen from com-petition with their fellows, the number there would be so great as to endanger the public peace. A few illustrations will suffice to peace. A few illustrations will suffice to show the present condition of European labor in both manufacturing and agricul-tural districts, but particularly in the

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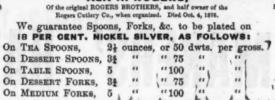


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less. A recent consular report to our own government places the average daily wages in France at 45 cents, and the amount of the annual revenue of a representative French family, composed of father, mother, and five children, one of which is old enough to work, at \$179.20. Its average annual expense is estimated at \$167, or \$3.21 a

week.
During the first half of 1878 the average daily wages of colliers in Belgium were 2.86 francs, or 55 ceuts, per day, which was a decline from 3.08 francs a year previously.
In Russia the wages of a peasant usually range from 14 to 37 cents a day, and the wages of his wife or daughter from 7 to 14

The Austrian State Railways employ over 12,000 men, women and children. The wages of the men vary from 36 cents to \$1.09 a day; the average wages paid to the

\$1.09 a day; the average wages paid to the women are 20 cents a day, and to children 16 cents a day.

In Westphalia, in Germany, the wages of general workmen in iron and sheet ware works in 1875 were \$4.50 a week, and the wages of day laborers were \$3.80 a week. Agricultural laborers throughout Germany received from 31 cents to 53 cents daily in 1878 if men, and if women about one-third less. In Italy the average wages of masons, carpenters, smiths, and other mechanics are

carpenters, smiths, and other mechanics are about 65 cents per day of 12 hours, the minimum being 50 cents and the maximum \$1.20. Ordinary laborers on government railways

about 05 cents per day of 12 hours, the minimum being 50 cents and the maximum \$1.20.
Ordinary laborers on government railways are paid from 50 to 60 cents a day. Agricultural laborers throughout Italy receive from 25 to 40 cents a day, without board, except in harvest, when they are paid from 60 to 70 cents per day of 15 hours.

In Great Britain the wages of labor have been repeatedly reduced during the past few years, and every week brings us telegraphic intelligence of still further reductions. In October, 1878, the earnings of Scotch miners averaged 2/9 a day. In Durham the price now paid per ton for mining coal is 1/10, and in 1871, before the rise, the price was 2/ a ton. Notwithstanding this reduction, notice of a still further reduction of 20 per cent. has been given to the Durham miners, and the surface laborers at the mines have been notified that a reduction of 12½ par cent. will be made in at the mines have been notified that a reduction of 12½ per cent. will be made in their wages, coupled, however, with a reservation that the wages of able-bodied men shall not be brought below 2/6 or 61 cents a day. In the iron-mining industry in the North of England, wages which in 1871 were fixed at the rate of 11d. per ton rose to 1/4 per ton in 1873, and have now fallen to 10d., from which it is probable that a penny per ton will shortly be taken. The price of puddling in England is now 7/6, or \$1.82, a ton, and about one-third of this sum the puddler pays to the helper. Much destitution and suffering have prevailed among British workingmen and their families in consequence of the reductions in wages which have been noted, but the full force of the existing hard times in Great Britain has fallen upon the tens of thousands who have fallen upon the tens of thousands who have been thrown out of all employment and denied any wages.

In all European countries women are

engaged in many masculine employments, and children in employments to which they are unsuited. Of 5887 persons employed in the iron mines of Sweden in 1876, there were 421 women and girls. At Creusot and other French iron works women perform a large part of the labor about blast furnaces and above ground at the coal mines. All the work at the coal washers is done by them, and they are also employed in wheeling coal. French women work in the fields, performing the labor of men, and in some of the cities of France men, and in some of the cities of France they may be seen cleaning the streets, dig-ging cellars, and doing other work which in our country is only performed by men. Women and children, both boys and girls, work about Belgian blast furnaces, wheeling coal and ore, and also work in the coal mines. The government recently refused to exclude women and girls from the mines, but fixed the minimum age of boys working in the mines at 12 and that of girls at 13 years. In Italy, Austria and Germany women work as regularly in the fields as do the men. In Wales they engage in many the men. In Wales they engage in many laborious outdoor employments. In England thousands of young girls are still employed in carrying clay in the brickyards. It will readily be inferred that the food and clothing, and household comforts of the family of a European workingman are not such as the families of our well-to-do American mechanics and farmers are accustomed to. A condition of society which requires such sacrifices and imposes such privations

AMERICAN COMPETITION IN FOREIGN IRON AND STEEL MARKETS.

lesirable in this country.

A study of the present condition of the A study of the present condition of the iron and steel industries of Europe and of the condition of European labor naturally leads to the inquiry whether the iron and steel manufacturers of the United States can compete in foreign markets with industries so depressed and with labor so poorly rewarded, and to the further inquiry whether they could hold possession of the home market if the protection now afforded by duties on imports were withdrawn. It is clear to me that if the crude and coarse forms of iron and steel be considered, such j forms of iron and steel be considered, such as pig iron, bars, rails, plates, sheets and beams, neither of these inquiries can be answered in the affirmative.

It is well known to every well-informed

It is well known to every well-informed person that the prices of iron and steel in this country never were so low as they are to day, and that these low prices are the result of the severest home competition which has ever been experienced. With the knowledge of this severe competition and its effects before us, it is not a reasonable supposition that prices can go much, if any lower than they now are. And yet there are many countries in Europe in which both iron and steel are made much more cheaply Bearings,
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ages referred to, cheap transportation is most prominent. In the United States our most prominent. In the United States our best ores are found at long distances from the fuel that is needed to smelt them; much of the pig iron manufactured is necessarily made at long distances from the works which refine it into finished iron and steel; and even the finished product is usually trans-ported hundreds of miles before it reaches the consumer. In Europe the ores and fuel are usually found in proximity to each other and to finished iron and steel works, or can and to finished iron and steel works, or can be cheaply transported. The territorial ex-tent of the leading manufacturing countries of Europe is small indeed when compared with the wide extent of our own country, and the mineralogical riches of Europe are distributed with remarkable evenness. Hence railroad transportation is not there the tax that is in this country, and canal and ocean transportation still more cheaply serve the European manufacturer and ocean transportation still more cheaply serve the European manufacturer by bringing to him raw materials or taking his finished product to a market. It is a fact which the books of leading manufacturing companies will verify, that fully one-third of the cost of all the finished iron and steel that are made in the United States is created by unavoidable railroad transportation. If it were possible to make iron and steel in this country with-out paying this tax to the railroads, there are few railroads that would pay a dividend to their stockholders, and the building of new railroads would practically cease, for all our leading railroad companies derive a large part of their revenue from the transportation of the ore, coal, coke, limestone, pig iron, and finished iron and steel used at or produced by our iron and steel works.
With the cost of transportation reduced 50 per cent., and the price of labor reduced to the European standard, this country could make iron and steel as cheaply as Europe, but neither result is possible, and neither is desirable.

Among the natural manufacturing advan-

desirable.

We will doubtless continue to increase our exports of such products as hardware, edge tools and light specialties, in the production of which American ingenuity has given us an advantage; but bulky iron and steel pro-ducts, which are manufactured with mateducts, which are manufactured with materials and by the employment of skill that Europe possesses in common with ourselves, we cannot export in appreciable quantities, even to our nearest neighbors. A reference to the statistics of American exports will show that we cannot. Our iron and steel manufacturers will do well to abandon the hope that such a result is possible. The statesmen of the country need not look for these manufacturers to swell our foreign commerce with their products. The home market is all that they can supply under existing conditions, and in supplying it with good iron and steel at the lowest prices ever good iron and steel at the lowest prices ever charged to American consumers, they will find sufficient employment for all their energies, and perform a service to their countrymen far greater than could follow an uncertain struggle with overcrowded countries for the supply of foreign markets.

I trust that no man, be he statesman or manufacturer, will be deluded with the thought that our most formidable rical—(Great Britain—will cease her efforts to re-

thought that our most formidable rival—Great Britain—will cease her efforts to regain possession of our home markets. Her manufacturers of cotton, woolen, iron, steel and other products are forcing labor to accept as low wages as are paid in the poorest country on the Continent of Europe, and with the many natural and acquired manufacturing advantages which they possess, they will in a little while set at defiance the manufacturing advantages of all other counmanufacturing advantages of all other countries. Temporarily under a cloud, because of the progress made by other countries in developing their own resources, or because of their financial inability to continue the large orders once given to her manufacturers, Great Britain will make a desperate ef-fort to emerge from it by seeking to under-sell the whole world. Against this fresh assault most Continental countries, and some British colonies, will defend themselves with British colonies, will defend themselves with protective tariffs, and if this country would not see many of its leading industries over-thrown, it must resolutely adhere to the revenue policy which has developed those industries, and which is enabling the country to-day to enter with hope and confidence upon a new era of prosperity.

Iron Tubing for Refrigerator Cars.

The National Tube Works, of Boston, have of late commenced the construction of Tiffany refrigerator cars, built with a frame-work of wrought-iron tubes and steel rods, by which means the weight of the car is con siderably diminished and longer life secured The framework consists of four iron sills to a car, each sill being constructed of three two-inch iron tubes or pipes, and the four sills are bolted together with steel rods running across the car every 16 or 18 inches. The sides and top of the frame are of steel rods running crossways and longitudinally, and firmly bound together. This substantially forms the framework or skelesubstantially forms the framework or skele-ton of the car. The Tiffany system of re-frigeration includes wooden sheathing with-in and without, and the principle consists of three dead air spaces between and through-out. These air spaces have an additional protection by being paper lined. The doors are double, and have india-rubber bearings to make everything air-tight. The ice cham-ber is on too, the car being nearly two forces. ber is on top, the car being nearly two feet higher than an ordinary freight car. The external appearance of these cars is not unlike other refrigerator cars, except that the iron sills referred to are not sheathed in with

As has been said, the refrigerator cars re? ferred to in this article are the first that have ever been built with iron tubes and steel rods as a framework; but for three or four years past flat and box freight cars, built by the National Tube Works Company, have been in use. This make has since been in-

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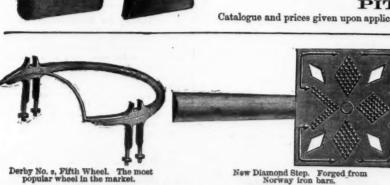


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456 E. Housjon St., New York City, Combination vs. Competition.

The Boston Commercial Bulletin of the oth inst. contained the following state

"The tack manufacturers are beginning "The tack manufacturers are beginning to find that combination, when carried to its legitimate results, is not so profitable as they had supposed. For years they have formed a strong organization dictating terms to consumers; but their tactics have been borrowed by their workmen, who have excluded apprentices and jealously guarded the secrets of the business. Now that the profits of the manufacturers' arrangement have departed, the men refuse to go back to ante-panic wages, and threaten a general strike."

This has brought out the following reply from a prominent manufacturer, which wil

be read with interest: be read with interest:

"Referring to your brief article of May 10, concerning a former combination among the manufacturers of a staple line of hardware, I beg to call your attention to the fact that their organization was not an exceptional one. In most lines of standard hardware where facilities of supply largely expressions. ware, where facilities of supply largely exceed the export and domestic demand, experience and a practical knowledge of the business have forced manufacturers to the conclusion that combinations are a necessity

"Notice the organizations are a necessity in order to 'live and let live.'
"Notice the organizations of manufacturers of wood screws, cut nails, cordage, tubes, horse-shoe nails, bolts, common locks, copper and brass manufactures, &c. Although these several associations differ in their forms and methods, still they are all governed by the same principles and are governed by the same principles, and are substantially the same. Yet none of them have for their object the 'fleecing of the public,' and much less the dictation of arbi-trary terms to customers, whom it is their interest to serve and to please; but primarily, and above all, they seek to regulate produc-tion and avoid reckless competition.

"Combinations, like more public bodies, are not always governed by the wisest counsels, but on the whole they are well conducted, and tend to the benefit of members of the trade (buyers), and the community at large. trade (buyers), and the community at large. The necessity for such organizations in some of the lines mentioned seems too obvious to need illustration. Notably is this the case with screws. The American Screw Company alone have a capacity sufficient to supply the demand of the entire country. In tacks, statistics prove that less than half the number of machines now operated in the United State, if run 60 hours weekly, would United State, if run 60 hours weekly, would produce a surplus over the legitimate wants of the trade. In cut nails and cordage business is equally overdone. In horse-shoe of the trade. In cut halls and cordage business is equally overdone. In horse-shoe nails, common locks, curry combs, and many other like articles the same state of affairs exists. Therefore without an agreeaffairs exists. Therefore without an agreement (or combination, if you please) to be mutually forbearing, the outlook for these manufacturers is indeed discouraging. They have not the advantages of makers of 'specialties,' for in staple manufactured goods the 'makes' of the best manufacturers are often so much alike that it is impossible to tell which is which, thereby enabling one reckless manufacturer to establish prices for a dozen competitors who endeavor to be prudent.

"If in the event of no combination, the 'survival of the fittest' is contended for, it becomes not so much a question of econoit becomes not so much a question of economy, as might naturally be supposed, but of the 'deepest purse.' Finally, when a majority of the manufacturers are compelled (from prudence, or exhausted means, or other causes) to stop their machines, the 'survivors,' tiring of warfare, advance prices, hoping to regain their losses. But how does it work? Immediately the idle machines start, us again, many under new machines start up again, many under new management, and to recover an outlet for their product 'cut' prices again, until soon all are selling below cost as before. And this will continue over and over again, so long as facilities for production largely exceed requirements.

ceed requirements.

"The remedy is plain enough, I confess, but the difficulty is to enforce it. Sad as is the commentary on human nature in general, and certain classes of manufacturers in particular, yet is it nevertheless true that moral courage to let a customer 'go' when he can buy lower of a competitor, even at a loss, is extremely rare. Hence combinations which cultivate a healthier sentiment in this regard. in this regard,

"As to the general effect of combinations,

"8. Small consumers are usually indif-ferent as to prices, as they obtain their goods at least as low as their competitors, which is the principal desideratum to them; and unless prices are unwisely high (a rare thing), the few additional pence paid by the small consumers are no hardship to them; but, considered in the light of offsetting ad-matters are lly extract to their henefit.

said above, this is exceptional, and generally results to the disadvantage of those who sanction it. The fear of encouraging new investments in the business is alone sufficient to deter manufacturers from seeking ways that fair values or their investments. more than fair returns on their investments, thereby protecting the public, if need be, from being charged undue profits.

"But, after all, much as combinations are

desirable, such is the jealousy, prejudice and perversity of some manufacturers, that it is extremely difficult to persuade them to 'bury the hatchet' and 'agree to be good.' Often they wait until bankruptcy stares them in the face, and some even prefer bankruptcy to affiliation with a 'hated' competitor. "But manufacturers of the staple articles

"But manufacturers of the staple articles above named, as a class (i. e., the great majority who rule, not by might, but by force of intellact), believing in earnest, enterprising, legitimate competition, in the attainment of every excellence in the quality of their goods, in improving the methods of manufacture, in conceding the advantages of merit to the meritorious, in making our market the supply market of the world, deem these objects, their own interests and those of the public, best subserved by mutual harmony, co-operation and agreement (this under the name of association or combination, as you please.) tion, as you please.)
"In conclusion, permit me to say in rela-

tion to your remarks that the Taunton strikers learned their tactics from their employers, that you have been misinformed, as their union antedates that of the late organization of their employers. But I will not discuss this labor question now, as I have already written much more than I intended.

"The expediency of combination is a mat-ter of very deep importance to the manu-facturers, whose business is now unprofitable without it; and your views and the views of others on the subject, would please and interest a very large number of your

Shipping Dynamite and Nitroglycerine.

The recent explosion of dynamite in transit in Canada, will make the following statement by Mr. Geo. M. Mowbray to the Ottawa Citizen, one of general interest, as showing the measures taken there to prevent the occurrence of similar disasters:

Under a penalty of \$5000 and not exceeding yoars' imprisonment, all packages containing nitroglycerine or any compounds thereof, must be legibly marked on three sides, "nitroglycerine, dangerous." Notice of the contents of any such package must be given to the freight agent, that the packages contain nitroglycerine or some mixture therof. The method of packing, so as to theref. The method of packing, so as to absorb any oozing out, is prescribed. Nitroglycerine can only be transported in a car either provided by the railroad company or by the forwarder, specially fitted so as to maintain the explosive in a congealed state, and a messenger from the forwarder or consignee must ride in the car with the explosive. Since these regulations have been in force there have been no accidents, and if the manufacturer be careful not to surcharge his composition with nitroglycerine. charge his composition with nitroglycerine, so that it does not ooze out, explosion is impossible. Very large quantities of these explosives have been moved without the slightest accident during the past 12 years. singness accident during the past 12 years. In 1867 it was discovered by accident that, when congealed, a fulminate may be exploded in a cartridge of nitroglycerine without exploding the nitroglycerine itself. Now, since the nitroglycerine congeals at 45° F., ice at 32° F., the latter furnishes a cheap and ready means of reducing it to the non-explosive state: a properly constructed. reducing and ready means of reducing it to the non-explosive state; a properly constructed refrigerator car will maintain 10 tons in that condition for a month, with an expenditure of 5 tons of ice. The railways leading to the coal regions of Pennsylvania fix certain days, say the first of the month, to receive explosives, and the quantity consumed in explosives, and the quantity consumed in sinking shafts has been enormous. Contractors cannot remove hard rock at present competitive prices, except by means of these explosives. While a spark will ex-plode a keg of gunpowder, nitroglycerine and its compounds require a shock (best given by means of a fulminate); but when these compounds of pure nitroglycerine are congealed and maintained in that condition, they are no more dangerous to transport than soap, lard or butter. Shock will not then exsoap, lard or butter. Shock will not then ex-plode them, and flame is incapable of causing an explosion. To debar the contractors of Canada from the economy of these modern lard or butter.

such as those referred to, organized under the conditions and for the purposes which I have named, they seem to me desirable on many grounds.

"I. They promote the welfare and prosperity of the industries fostered by them, thereby rendering a benefit to the State.

"2. They enable the manufacturer to obtain fair returns on his investment.

3. They give the workman steady employment, and enable employers to pay fair wages (and better for the workmen are curtailed hours of labor by the year than occasional 'full time' by the week).

"4. They stimulate manufacturers to make better goods, that the inducement of superior everlence were to mostly in such high relief as to utterly deface the dead-wall effect but too face the dead-wall effect but to face the dead-wall effect b obtain fair returns on his investment.

3. They give the workman steady employment, and enable employers to pay fair wages (and better for the workmen are curtailed hours of labor by the year than occasional 'full time' by the week).

"4. They stimulate manufacturers to make better goods, that the inducement of superior excellence may be offered buyers, in lieu of 'cut' prices.

"5. A prosperous manufacturing business conduces to the prosperity of the place in which it is located.

"6. Dealers are benefited in being assured uniform prices, knowing the lowest, and enabled thereby to obtain a profit. (Without a combination a buyer of \$25 value often obtains his goods as low as the buyer of \$1000 value, to the detriment of the large dealer and the manufacturer as well.

"7. Large consumers are benefited by having stability in an important item of cost.

"8. Small consumers are usually indifferent as to prices, as they obtain their goods at least as low as their competitors, which is the principal desideratum to them; tand the partico, and at the portico, and at the port where the largest Melbourne has yet known) will be, first, a dome higher than the highest spire in the city, flanked by a number of smaller towers of pavilion shape; and, secondly, a variety of ornamental details, mostly in such high relief as to utterly deface the dead-wall effect but too frequently conveyed under similar circumstances. The building, excluding the temporary annexes for machinery, &c., is cruciform, consisting of a nave 500 feet long, running from east to west, and cut through its center by a transept 270 feet deep, the ends of which are north and south. This transept is the leading feature of the fabric. At its south end is the chief portal—a tall arch, 40 feet wide and 60 feet high, deeply recessed, and reached by a flight of broad stone steps. On each side are square towers, 105 feet high, adorned by picturesquely shaped and well-grouped windows, together with Ionic pilasters and enriched panels. The north end of the transept is hind the portice, and at the point where the transept intersects the nave, rises the dome, octagonal in form, and reaching the hight of 223 feet, being about 130 feet above the main roof. As the dome rears itself above the main roof it is surrounded by columns, but, considered in the light of offsetting autonated and the variages, really retroact to their benefit.

"An argument is frequently made against combinations that they may, if they will, establish high prices; that they become insatiable through their opportunities, and often obtain inordinate profits. But, as I the diameter is contracted to 60 feet,

The Iron Age

Metallurgical Review.

New York, Thursday, May 22, 1879.

DAVID WILLIAMS . - Publisher and Prop JAMES C. BAYLES -

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Prices. Thirty-fifth Page.—Boston and St. Louis Hardware and Metal Prices.

A fresh example both of the folly of strikes and the inconsistency of those engaged in them, is found in the action of the glass chimney blowers of Pittsburgh. Months ago—how many we do not recall these workmen struck against the introduction of a labor-saving machine known as a "patent crimper." For over a year this strike continued, and at last the workmen, after all their losses, have resumed work on the terms originally proposed by the manufacturers. This, of itself, is evidence of the folly spoken of; but it is stated that a number of the striking workingmen went to Chicago and worked at the same rate, and for the same parties, that they refused to work for in Pittsburgh. In other words, two of the chimney manufacturers against

they struck. After more than a year the strike has ended, and they return to Pitts-burgh to work at the prices offered. It cer-tainly seems strange that men of the acuteness and intelligence of many of our American workingmen, will pursue a course that has been so devoid of sense and reason as this strike. It was, in its inception, a strike against labor-saving machinery—a fight against the inevitable.

Alexander Lyman Holley.

The tributes paid to the personal worth and professional services of Mr. A. L. Holley, at the Pittsburgh meeting of the American Institute of Mining Engineers last week, were so spontaneous, and expressed so truly the feelings of all who know this remarka ble man well enough to understand why he is so dear to his personal and professional friends, that we venture upon a task which, though somewhat unusual, is in this instance peculiarly agreeable — that of recounting a few of the great services which this able and conscientious engineer has rendered the country, in promoting the development of the steel industry in the United States. Though in the prime of life, Mr. Holley has witnessed changes in the theory and practice of metallurgy which, in an earlier era of civilization, would have been the work of centuries To stand first among the ten or twelve men who have made the manufacture of Besse mer steel the great success it has become in this country, is an honor of which any engineer might be proud. This position is accorded to Mr. Holley by those who have worked with him, and a brief tribute to his worth and his work may properly accompany the report of the Pittsburgh meeting of the Institute of Mining Engineers, which

will be found in another place in this issue. Under the management of Mr. Holley, who, when in England in 1862 and 1864. recognized the value of, and succeeded in purchasing the patent rights for, the Bessemer process, the Troy Works were started on an experimental basis. He subsequently designed and assumed temporarily the management of the Pennsylvania Steel Works. and then, in 1868, reassumed his former duties in connection with the Troy Works which he remodeled in a great degree. His next step in the development, or rather the next establishment which may be regarded as the embodiment of the preceding years of careful labor and unceasing application, were the works of the North Chicago Rolling Mill Company. This was in the next year followed by the erection of the Bessemer establishment of the Joliet Iron and Steel Company, and jointly with Mr. John Fritz, Mr. Holley elaborated the designs for the plant of the Bethlehem Iron Company. For these, as well as for the Edgar Thomson and the Lackawanna Iron and Coal Company -the two last works built-Mr. Holley acted as consulting engineer. There is hardly any one department of American Bessemen practice which does not bear the imprint of Mr. Holley's mechanical genius, every effort of which was directed to the attainment of that wonderful output, coupled with the utmost of precision and economy of manipulation, which has placed the American type of Bessemer plant almost without a rival in the world. As an instance of the rapidity of this development, it may be of interest to recall a statement made by Mr. Robert W. Hunt, that in 1868 Mr. Holley proclaimed that at last his dream was cealized; the Pennsylvania Works were making eight conversions per day, producing 40 tons of ingots in 24 hours! In 1878 almost ten times that amount was reached. This has been attained both by a thorough adaptation of the general disposition of the machinery to the requirements of the process, and by numerous and momentous improvements and elaborations of detail. Among the fruits in the first direction are the adoption of a shallow instead of a deep pit, the introduction of an accumulating ladle placed on scales, the use of three topsupported hydraulic cranes, and the placing of the converters and the melting cupolas in such a position as to secure facility and rapidity of work, manipulation, repairs, ventilation and transportation. Among the most prominent improvements of details has been the invention of the movable converter bottom, which has done much toward the attainment of the present enormous number of heats, and the modification of the melting cupolas, which has contributed largely to

the same end. Mr. Holley has always taken a prominent part in all discussions pertaining to the metallurgy of steel, as his numerous contributions to the American Institute of Mining Engineers, of which he has been president, and to American and English technical journals and societies, testify. More recently he has added much of value to the literature of the manipulation of phosphoric steel and the modern modifications of the open-hearth steel process, while his labors during and in connection with the Centennial Exhibition, will long be remembered by

foreigners as well as Americans. Mr. Holley is one of the most revered of men, and it remains for his friends to make known the value of the great services he has rendered the metallurgical industries of the country. In this article we have but briefly recounted that part of his life work which has been most conspicuously useful.

made those graces sweeter and to have the more endeared him to his friends. As we speak not for ourselves alone, but for hun-dreds of his professional associates, we need offer no apology for this tribute, which he of all men would least desire to see in print.

The Labor Troubles at Pittsburgh.

The question as to what price shall b paid skilled labor in the iron mills of Pitts burgh and the West for the coming year bids fair to be decided by a strike. Last Saturday evening the Amalgamated As sociation of Iron and Steel Workers held a secret convention, at which, if reports are to be believed, it was decided that they would concede nothing in price, but would demand a renewal of the present sliding scale, by which the price of boiling is fixed at \$5 per ton. As the manufacturers state most emphatically that they cannot and will not continue to pay this price, a strike seems inevitable on the 1st of June at which time the present arrangement expires by limitation. If both sides mean what they say, a bitter and disastrous industrial conflict is before Pittsburgh."

The situation at Pittsburgh is this: year ago this time a committee of boilers from each mill in Pittsburgh, presented to the owners of the mill in which they worked what they call a "sliding scale," demanding the signature of the owner to the same under a threat, either expressed or implied of stopping his mill. An article so signed in whose formation the manufacturer had no part, and which he signs under duress is called a "contract," and is worded as fol-

lows: When card rates of bar iron are—Per too
2 c-10 cts. per lb.....boiling shall be \$5.6 1-10

The above agreement and scale of prices on tinue until the 1st day of June, 1879.

This "contract," it should be noted, is made between each manufacturer and the men in his employ, and not between the union and the manufacturers as a body, though, of course, it is well understood that the union is back of it. It is on the demand for the renewal of this "contract," which expires June 1, that the struggle will come. If the manufacturers refuse to sign it—and they declare most pos itively that they will refuse—a strike will probably ensue. At the meeting above referred to, the workmen appointed a committee to hold a conference with the manufac turers if they should ask it, but the committee were not to ask it under any circumstances This may be an evidence of weakness or of strength-probably of the former, for it is fact that the union was never in a worse condition to endure a strike than at present. The president has been East for a number of weeks, trying to organize lodges of the union and to get assistance, but has utterly failed. At Johnstown he was sent about his business very speedily. At Altoona he succeeded in forming a lodge and getting the men to make a demand for an increase but it proved a failure. The strike that resulted soon came to an end, and the union was broken. At other points he was equally unsuccessful. He found a bitter feeling among the workmen at what they regard as bad faith of the union toward them in the

If a strike does result, it will be the most extensive one ever known in Pittsburgh, Most of the strikes heretofore have been of only one trade, as the boilers, or rollers or nailers, the balance of the men keeping at work. As all classes of labor are now organized in one union, instead of each having its separate union, as heretofore, if a strike occurs it will entirely close the mills. Boil ers, heaters, rollers, nailers and all will go out. While this will throw more out of work, it will tend to shorten the struggle. The idle men will be deprived of the aid they have heretofore received from those at work, and will be thrown upon their own resources and those of the union. It is true that the workmen, in accordance with orders received from the union some months since, have been saving what of their earnings it was possible to save, and will thus be somewhat better prepared to stand a struggle; but when a man has once saved anything he is loath to let it go.

We have so often criticised the course of Fernando Wood, and of the Ways and Means Committee under his leadership, in dealing with the tariff question, that we regard it as a privilege to recognize the genuine service they have done the country in refusing to consider this question during the present session of Congress. The business interests of the nation are heartily sick of the agitation of any subject that disturbs the present relations and throws an uncertainty over the future; and though we do not believe ing tariff laws, the attempt and consequent business, and just at a time when any extra

decision of his committee to let the tariff

The "Basic Lining" for the Bessemer Converter.

The summer meeting of the British Iron and Steel Institute, to which all ironmasters and metallurgists have been looking forward with much interest, and perhaps some anxiety, has been held, and the report of its proceedings has just come to hand. readers will find on another page careful extracts of the papers read on the engrossing topic of the day-the dephosphorization of pig iron in the Bessemer convertar, with the aid of a basic lining and basic additions. There will be, no doubt, some disappoinment that the paper on the Thomas-Gilchrist process does not contain sufficient additional data of a practical character to determine some doubtful points, and that it does not give fully the results of at least a few days continuous working on a large scale. whole iron and steel trade has been on the tiptoe of expectation, and it is only natural that the fact that experiments such as those involved require long and laborious work was lost sight of. Nevertheless, the papers submitted-those of Messrs. Thomas-Gilchrist, Snelus and Riley-deserve careful attention, and will give a better idea of the situation.

The discussion which followed the reading of the papers, for a remarkably early and full account of which we are indebted to the enterprise of the Ironmonger, brought out much valuable criticism and many important suggestions. One of the most notable statements made during the discussion was that by Mr. Richards, who said that the cost of the basic brick did not exceed that of ganister. As regards its durability, Mr. I. Lowthian Bell very forcibly pointed out that the function to be played by the lining was inconsistent with its operation as an eliminator of phosphorus. He did not agree with another speaker, who feared that a failure to obtain good work regularly might prove a serious drawback, as he thought that even if the metal from some ex ceptional blows did approach the limit of 0.2 phosphorus, which all the analyses published failed to reach, the difference in price of the phosphoric steel would render it valuable nevertheless. He considered the addition of basic materials to be probably indispensable to success, but believed that the presence of a considerable quantity of oxide of iron was absolutely necessary, and that it might prove cheaper, as he held it to be as good an absorbent. In this he was sustained by Mr. Pourcel, of Terre Noire, who stated that he attributed the dephosphorization rather to the presence of oxide of iron, formed by the process of blowing, than to lime.

Dr. Siemens also thought it was a question how much oxide of iron was necessary to accomplish the dephosphorization, and how much of that oxide of iron was produced by overblowing the charge. He apprehended some difficulty with the renewal of the lining, while others considered the increased loss of metal during the process, a matter worthy of serious consideration. In order to prevent any large quantity of iron being carried into the cinder, a large bulk of basic additions would be necessary, and this, it was hinted, would be a source of inconvenience. Mr. Parker drew attention to the danger of overblowing, which he urged would necessitate a large amount of spiegel for its correction, while Mr. Stead believed that, as an enormous heat would be required for such a considerable amount of fluxes some difficulty might be experienced through cold working and the formation of skulls As for the losses of metal, Mr. Stead differed from some members, as he thought that only 12 per cent. of the iron would be burnt even in the most unfavorable cases, and that a yield of 85 per cent. would be got from the pig. Mr. Richards, in replying, stated that a simple means for insuring regularity of work would be sampling and testing under a hammer. Mr. Gilchrist took exception to the term "overblowing," for which he proposed to substitute "afterblow," as its object was only the removal of the metalloids. He stated that there was no difficulty in making repairs.

The most important issues raised in the course of the discussion were, therefore: First, the question as to the necessity of the basic additions to preserve the lime lining from rapid wear; secondly, the importance of the lime as a constituent of these basic additions, in which respect there is conflicting testimony, some holding that oxide of iron alone could do the work as well and cheaper One important point seems to be conceded, the ability of the lime lining, as at present made, to resist the abrasive action of the blowing, it being only a question whether and how far it will withstand the chemical

We give to-day the conclusion of our re-port of the proceedings and excursions of that, had the sliding scale been continued the meeting of the American Institute of downward, a 5 per cent. reduction would Mining Engineers. Its faithful record of be the result. the enjoyments and labors of those who peated their former offer, which was rewere so fortunate as to be present will, we that the committee could have succeeded in any attempt to materially modify the existquate, substitute to those whom stern duty plete cessation of communication until the kept at home, while it will serve to refresh masters, on the 4th inst., appointed a discussion would certainly have had a the memory of many members whom the committee of fourteen, with powers, to set depressing effect, especially in the iron rapid succession of events has no doubt left the question at issue. By telegraph we whom the strike was established have works at Chicago, and the striking workmen went there and worked at the rates against which there and worked at the rates against which there are the companies of the committees and worked at the rates against which there are the committees the committees there are the committees there are the committees the committee

The Durham Strike.

It has been repeatedly and earnestly stated in England, by eminent politico-eo nomical authorities, by manufacturers and by the press, that much of the present de-pression of industry in Great Britain is due to the unwillingness of the laboring classes to perceive the necessity of reductions in wages and bear their share of the present losses. They urge that, while they are forced to struggle with their workmen for concessions which are inadequate and follow the fall in prices slowly and insufficiently, their foreign rivals, being in harmony with their workmen, who, compared to the English, are temperate and frugal, outstrip them not alone on neutral ground, but con test with them in markets hitherto their own, These statements invest the relations of labor and capital in England with more than ordinary interest for Americans, who are now becoming the competitors of British manufacturers in foreign markets.

We briefly referred, in a recent issue of The Iron Age, to the war between employers and employees in the Durham coal field, and as the history of the strike now in progress shows admirably many phases of the relations of English laborers to their employers, we make room for a summary of the development of the present system in that district. The Durham miners were driven to extreme measures as early as 1810, and a second time in 1832, being victorious, and justly so, on both occasions—the latter being, by the bye, a rejection of the store system. In 1844 the miners again struck, and though they held out for almost five months, they were forced to submit and return to work on their employers' terms. Since then, until within a few months, there has not been any general suspension of operations caused by a failure to agree between colliery owners and miners. During the years 1871, 1872 and 1873 prices for coal rose enormously, and accordingly wages were increased successively by 20, 18 and 20.7 per cent., making a total advance of 58.7 per cent. Prices for coal sank again rapidly, falling from 15/10 per ton in January, 1873, to 12/8 in April, 1874, to 10/1 in August, 1874, to 6/6 in October, 1875, to 5/8 in August, 1876—the present average selling price at the pit's mouth being represented to be, by a good authority, as low as 4/7. During this decline 15 per cent. was at first given up by the miners in April, 1874, but in October of the same year 20 per cent. more was demanded by the masters, and it was in connection with this claim that the system of arbitration was first applied in the Durham coal trade. The umpire chosen awarded them 9 per cent., which was followed by successive reductions, under the same system of 5, 7 and 6 per cent. on underground labor. Both parties adhered loyally to the agreement, although neither was entirely content with the operation of the system. Accordingly, a sliding scale was agreed upon in March, 1877, and as it is a departure from this sliding scale, or rather dissatisfaction with some of its clauses, which provoked the strike, it will be of interest to give its main features.

The scale agreed to made the following provisions for prices to be paid for underground labor :

Price Price.
At and above But below Wages. 5.8 Current rate (about 4.9).
7.0 5 per cent. reduction.
5 per cent. advance.

and so on, an advance of 5 per cent. for every

8d, of increase in the market price of coal. All that the miners could lose as long as this scale was in operation was, it will be seen, a reduction of 71/2 per cent., whether the value of coal fell far below 5/4 or not. The first returns in 1877 proved that it had actually fallen below the minimum, and the 7½ per cent. reduction went into effect. But as prices continued to weaken, this was colliery owners, who at the expiration of two years, from April 2, 1877, according to a clause in the agreement, refused to renew it unless the minimum limit was abandoned. They demanded a reduction of 20 and 12½ per cent. on underground and surface labor, respectively, and rejected a proposition made by the miners to refer the whole matter to arbitration. They made, however, an alternative proposition that an immediate certain reduction in wages of 10 and 71/2 per cent., respectively, should be submitted to, referring further re ductions of 10 and 5 per cent. to arbitration The miners were willing to accept 71/2 and 6 per cent., respectively, and submit to arbitration for the rest, and then offered to agree as a definite settlement to 10 and 71/2 per cent., provided there was no arbitration be yond that. The miners claim, as stated by Mr. W. Crawford, Secretary of the Miners Association, that according to the figures of the accountants up to November, 1878, coals had fallen on an The masters in reply ry jected by the men by an almost unans in

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of the County Court, who was chosen as arbitrator, accorded a reduction of 834 per cent. on the wages on underground, and 6% per cent. on surface labor. Three-quarters of the colliers have gone to work on these terms, but meanwhile other circumstances have occurred which give rise to the fear that this estilement will not be lasting or final. A call was issued by the Miners' Association to meet on the 13th inst. at Barnsley. The aim of this conference, it was stated, was to combine all the miners of the great coal producing districts of England in a movement to advance wages. This conference was actually held, and is reported to have been attended by the delegates of 120,000 men, who solemnly concluded to ask for an adaddition of 10 per cent. at an early date. Whether this is an idle threat or not it is lifficult to estimate at the present juncture. It shows on the part of the men as un-compromising an attitude as that of the colliery owners, who, it is true, have ultimately ained a little more than those firms, like Bell Brothers, who were awarded 61/2 per cent. by an umpire during the course of the strike. Though temporarily settled, it seems but too possible that the dissatisfaction of both parties will soon lead to fresh complica-The great iron and steel, engineering, shipbuilding and chemical industries of the North have been seriously affected by the strike, and the constantly impending danger of a renewed conflict is not calculated to reassure the iron trade, which has been severely tried of late by such great failures as those of the Skerne Iron Works, of Darlington; Lloyd & Co. and Hopkins, Gilkes & Co., of M ddlesborough, represent-ing in all liabilities of more than \$4,000,000.

The Commerce of India.

The important events now taking place on the borders of British India bave brought, during the last few months, this immense possession of Great Britain once more prominently before the world, and a great deal has been written about its immediate future, its finances, &c. Our trade with India, at all times important, has been increasing rapidly since the war, and we are, therefore, directly interested in the prosperity of this great empire.

After doubling the Cape of Good Hope early in 1498, Vasco de Gama and his Portu-guese landed in India in May of the same year, and after some difficulties another great Portuguese navigator, Cabral, obtained foothold. Soon after the death of Shah Arungzebe, which occured in 1707, the English East India Company, founded in 1600, obtained during a period of anarchy its first firman, or grant, by which the company's goods were exempted from export and import duties. While, therefore, during coninual wars with the Dutch the Portuguese lost nearly all their possessions in India, the English gained their first hold upon the country quietly and without warlike demonstrations. During a subsequent period of anarchy, however, in 1748, the English and French came to confront each other, and from thenceforward a series of wars were waged by these two European nations in India, continued with intervals until the close of the last century, and ending in the undisputed supremacy of the British.

In 1813 British trade with India was, with some restrictions, opened to British subjects, and finally, in 1833, the commercial privileges of the company were entirely abolished, and when the company's charter expired some years since, the British government assumed direct sovereignty over India. The critical period which British rule in India had passed through in the meantime, during the Sepoy rebellion, in 1857, rendered it patent to all that the management of India's affairs, both civil and military, could only be carried on under a thoroughly reformed system, and the expiration of the company's charter lent a wider scope to this rule and strengthened the hands of the home government, whose power is delegated to a

India has become of such importance to England, both from a political and commercial point of view, that outside of the British Isles it is the possession deemed most valuable; hence the immense interest which attaches to it. The country is divided into three presidencies—Bengal, Madras and Bombay—covering an area of 908,971 square miles, with a population of 191,168,400; and there are also the tributary states, with an area of 558,724 square miles and a population of 48,236,200. Total extent, 1,467,695 miles, with a joint population of 239,404,600. The Hindoo is the prevailing creed. Mohammedans number 40,000,000, while the Christians form but a mere fraction-less than a million—of this vast population. The non-Asiatic inhabitants include: Englishmen, 75,734; other Europeans, 38,453; and Americans, 6961. There are 44 cities counting 50,000 inhabitants and upward, the most populous ones being:

Inhabitants.	Inhabitant
Calcutta 892,489	Bangalore 142,51
Bombay 644.405	Amritsur 135,81
Madras 397,552	Cawnpore 122,77
Lucknow 284 770	Pouna 118,88
Benares 175,188	Ahmedabad 116,87
Patna vel coo	Surate 107,14
Delhi 154.417	Bareilly 102,98
OKER TANKER TANK	Lahore 98,92
Allahabad 143,603	Rangoon 08,74

India's finances are not in a flourishing condition, especially since silver declined

on umpire for final decision. The Judge of India loses on this item alone £3,500,000 maunds, worth, at present prices, about the County Court, who was chosen as arver, while the interest on the public debt is in part paid in gold; the interest on railroad bonds, civil and military pensions, part of the English army in India, and war material being also paid in the more valuable coin. The capacity of the people at large to pay taxes, in the face of continual large deficiencies in the budget, is strained to the utmost, the bulk of the people being extremely poor. Thus the actual gross revenue in 1876 was £51,310,063, and the actual expenditure £53,911,747, which included £4,270,629 spent for public works, while the deficiency in the last financial year amounted to £3,543,087. The war in Afghanistan will of course not mend matters; the estimate for 1879-80 already includes £2,000,000 for it, and a fresh loan of £10,-000,000 is spoken of as requisite to provide for further contingencies. The consolidated debt of India amounted on the 31st March, 1876, to £122,570,014 and the non-consolidated to £11,488,620; together, £134,058,644, against £130,493,285 in 1875. It is evident that the mances of India present a problem not easily solved. The debt is large as it is, and a reduction of it can only be thought of after the campaign in Afghanistan shall have terminated successfully.

The foreign trade of India has been as

under, reduced to thousands of pounds

v	I decreased .					
		3M	PORT.	EXP	CPORT.	
3		175-196	76-77	*78-176	'76-'77	
*	Rice, paddy and ce-	10 1-	1- 11	13 10	1- 11	
8	reals	****	****	6,212	7,773	
t	Seeds and fruit Tea, coffee, spices	785	755	5,462	5,319	
9	and sugar	1,542	977	4,575	5,281	
	Liquors and beer	1,387	1,300	,0000		
,	Coal Metals and manu-	660	931	****	****	
	tures	3,622	4, TOE			
	Wool, ivory, &c Cotton, jute, silk		****	472	****	
	and wool	695	452	17,699	16,322	
	Hides and skins			2,945		
	Drugs, rosin, oil, &c	819	431	4,546	4,265	
1	Opium	****	****	11,148	12,405	
	Dry goods		20,648	2,671	3,124	
,	Other manufactrs.	2,368	1,823	133	131	
)	Sundries	5,569	6,010	2,230	6,396	
		38,887	37,428	58,002	61,014	
1	Coin and bullion	5,301	11,436	2,200	4,030	
,	Total	44,188	48,844	60,292	65,044	

In 1877-1878 the import of merchandis declined to £35,367,000, while the import of coin and bullion increased to £11,436,000 the export of goods, on the other hand, rose to £64,904,000. Sixty per cent. of the entire trade is absorbed by the home country; China represents 14 per cent. The import of India from the United Kingdom consists, to the extent of 84 per cent., of cotton, woolen and metal goods, and coal.

The maritime movement has been as fol-

lows:	Arr	ivals.—	-Depa	rtures
Flag— British Angio-Indian Foreign Native	Vessels. 1,635 2,103 817 1,684	Ton'ge. 1,788,346 283,085 451,495 106,997	Vessels. 1,798 1,862 888 1,653	Ton'ge. 1,937,521 251,069 501,999 108,474
Tot. 1875'76	6,259	2,629,933	6,20x	2,799,063

Of railroads, there were built last year 718 miles, increasing the total length now operated to 7552 miles, and the total outlay for the same to £113,344,500. During the previous year there were 6834 miles being operated; 6003 were private lines and 831 government lines. The gross receipts in 1876 were £8,744,317, and the expenses £4,227,162.

Prolonged droughts and famines are of frequent occurrence in India. In 1877 there was dearth in the South and an unusua abundance of breadstuffs in the North : all that had to be done, therefore, was to forward the grain by rail southward. In that year the enormous aggregate of 2,883,000 tons of grain was conveyed by the railroads to

its growing importance as a wheat and teaproducing country. Of wheat, India exported to England in 1871, 78,000 cwts.; in 1875-76, 2,498,185 cwts.; in 1876-77, 5,583,336 cwts.; and in 1877-78, 6,340,150 cwts. The export of India-grown tea to England rose from 9,000,000 lbs. in 1868 to 24,361,599 lbs. in 1876-77, and to 33,459,075 lbs. in 1877-78. Even in cotton spinning and manufacture India is making rapid strides. Thus she exported to foreign countries 7,926,710 lbs. of twist in 1876-77, and the ensuing year 15,600,291 lbs. Of cotton goods during the same period the export rose from 15,544,168 yards to 17,546,369. There are in India 48 cotton mills, 25 of which spin and weave and 16 weave only. The best operatives earn from £3 to £8 per month; the women and children, 14/ to £1 per month. There are 15 jute mills, producing £188,859 worth of gunny bags, &c., in 1872, and £719,478 in 1877. During the two years 1876 and 1877 they turned out 71,000,000 gunny bags. The silk industry, on the other hand, is declining. The same relates to the production and export of raw silk. In former years (1867-70) the export annually ranged between 2,145,000 and 2,574,000 lbs. In 1876 it had fallen to 1,700,000 lbs.

The area planted with cotton is also diminishing of late years, and has decreased from 4,516,000 acres to 3,232,000. Indigo, on the contrary, is rising. In 1877 there were produced 137,000 maunds (one maund its own. Tobacco has a fair prospect before it; quinine bark a brilliant one.

The postal service of India is being perfect-

ed as rapidly as the marvelous growth of trade demands. The ensuing figures will

sumee to	sumes to snow this:					
Years.	Postoffices.	Millions of letters.	Millions of newspa- pers.	Receipts.	Expenses.	
2872-73 1873-74 1874-75 1875-76	3,005 3,178 3,403 3,661	83 99 104 108	8 9 9	£877,047 676,645 719,587 752,094	£704,193 725,357 729,191 745,445	

This service, therefore, became a paying ne dating from 1874-75. The telegraph is keeping pace with the post office. On March 31, 1875, the length of lines in operation already extended over 16,649 miles the length of wire being 33,798 miles and the number of offices 225, forwarding 958,408 dispatches, which the following year increased to 1,166,833. The receipts in 1875-76 were £212,914, and the expenses

Our trade with British India during the past three fiscal years has ranged as follows:

1876 1877 1878	10,725,619		Exports. \$7571 3020 1843	Total. \$13,174,073 11,591,259 19,047,663
	ither du	ncipal goo		
Indian cor Cotton go				

The more valuable goods which we draw from India, such as indigo, are largely received through the Suez Canal vía London,

but the bulky goods, such as jute, gunny cloth and gunny bags, hides, goat skins, linseed, saltpeter, &c., have to be imported by sailing vessels. The freight by steamers would fall too heavily on these goods. The greater portion of the trade between the United States and India was in former years done from Boston, but gradually New York has absorbed this business. The old Boston concerns, grown rich in this trade, have been wound up, and as competition had rendered this business less desirable, but few new houses have been established in their place It has been different in this city, where th trade for the past twenty years has, to a considerable extent, been transacted by Greek firms accustomed to do a large trade on slender profits, and from being a business almost exclusively carried on by American firms, it has since assumed a more osmopolitan character.

Our commerce with India would be greater if that country did not chance to produce, on an extensive scale, some of the very staples which form a considerable portion of our own export—we mean cotton, wheat, &c. We are their competitors in these products in the European markets; but as we have shown, India has such a variety of goods for export that we are never at a loss for a home freight, and this being the case. India will continue to take petroleum and manufactures from us in increasing quantities, and that market will become more important for us in the future.

An Open Field for Iron Works.

The Denver Tribune makes the following statement on the iron and coal resources of Colorado, and points out the circumstances favorable to a local iron industry:

the famine-stricken districts. What would have become of the starving millions without this assistance the late famine in China has shown, where 40,000,000 people perished for the lack of food.

An equally important feature is the productiveness of India in various ways not dreamed of twenty years ago. We mean the star of the lack of the lack of the lack of the lack of food.

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An equally important feature is the productiveness of India in various ways not dreamed of twenty years ago. We mean the lack of food and the important of the importation of this important of the importation of the importation of the important of the importation of the importation of the importation of the importation of the importat increase, and may be doubled or tripled in a few years, for the reason that not only the mines of Colorado are becoming daily more productive and numerous, but also those of the adjacent mining regions. What is now imported from Chicago, St. Louis, Pittsburgh, Baltimore and other Eastern cities could be more cheaply drawn from Denver, as freight for local or grow miles of transas freight for 1000 or 2000 miles of trans-portation excludes all possibility of compe-tition, if Denver will make use of its advantages of geographical position and natural resources immediately within its reach. In the neighborhood of this city are immense deposits of iron and coal. We find layers of iron near Boulder, Ralston Creek, Morrison, Platte Cañon, Hall's Gulch, South and Mid-dle Park, all, except the latter, easily ac-cessible by railroads. The ore is partly mag-netic, and contains, on an average, about 55 per cent. of iron. Experiments made with ore from different places are highly satisfactory. Coal also is in abundance and cheap. Coal for steam purposes is found but a few miles distant from Denver, and for smelting it can be obtained from various places. Trinidad, in Scuttery Colorado, furnishes un convenit. in Southern Colorado, furnishes us now with coke, but our main reliance will be on the large deposit of anthracite and common bitu-minous coal on the western slope of the minous coal on the western slope of the Rock Mountains, where a belt of this kind of coal has been discovered on the bank of the Gunnison River, and also north from there as far as White River. The South Park Railroad and the extension of the Colorado Central Railroad from Georgetown are aiming in this direction, and we hope in a year or two to see the products of the coal fields of the western slope of the Rocky Mountains in our market.

"In Denver are four machine shops and a rolling mill. They are doing well; but we

from 61d., 18 years since, to between 48d. weighs about 80 lbs. English), against and 50d, per ource in the London market. 102,000 in 1876 and 127,000 in 1875. An furnace to make our own iron, before we lock to get above dam No. 1. Chess, Smythe & Co.'s works were then visited, the makrolling mill.

tries of a similar kind that impetus which will enable them to do justice to the wants of the country. We pay now \$30 for pig iron, and it is estimated by competent experts that we can produce the same article here for \$19, making full allowance for higher wages and other monetary inconveniences. We need men of experience, energy and capital to start in. Such will find here the richest harvest for their enterprise, and would soon become millionaires. Why does not Pennsylvania, for instance, move does not Pennsylvania, for instance, move her idle furnaces to Colorado, and bring her superfluous labor along, and thus bless both countries?"

The American Institute of Mining Engineers.

Proceedings and Excursions of the Pittsburgh Meeting.

PITTSBURGH, May 17, 1879. To-day concludes the most memorable meeting of the American Institute of Mining Engineers-most memorable because of the large attendance, the varied interest of the proceedings, and the abounding hospitalwith which the members have entertained. In our issue of last week we gave a full account of the proceedings at the day and evening session of Tuesday, the 13th inst. At that point we resume our report:

Wednesday was given up to the enjoyments of a sail on the rivers inclosing this busy city, and a visit to a number of interesting manufacturing establishments conveniently reached by boat. At the uncomfortably early hour of 8.30 in the morning, the members, their ladies and the guests of the local committee assembled at the Monongahela Wharf (so-called because there is no wharf there, but only a bank with a sort of covered pontoon moored to the bottom) and crowded the decks of the steamer Chartiers Valley. Mr. Shinn, who acted as marshal with an efficiency which is certainly "great-ly to his credit," had given notice that with Pittsburghers 8.30 meant 8.30, and not 8.35, and that if the boat had steam up she would leave at the appointed hour, whether any body was there or not. Consequently, every body was prompt, and the long line of colored men who filed on last, carrying sundry mysterious packages, suggested the idea that those who neglected to provide themselves with crackers and cheese and cold tea, would not hunger and thirst in consequence. The first point of interest was the alleged dam across the Ohio at Davis Island. It is called the Davis Island dam, but when one comes to look for it he is forcibly reminded of Ross Brown's description of his quest for a certain mill by a certain dam, which was in effect that he "found a dam by a mill site, but he didn't find the mill by a dam site." In a word, there is to be a dam at Davis Island, but about all there is of it at present is a house on the bank and some unfinished stonework forming part of the lock. It appeared on this part of the sail that the present is one of the times when, as Mr. Metcalf put it, "the river bottom is very high." It was suspected by some that the pilot struck the several bars to show how important it was that the improvements at this point should be completed, for he managed to get on just where he could conveniently get off again, without unnecessary delay.

Here we may say that the Chartiers

Valley is a very uncommon steamer. The area of her deck is 100 x 95 feet, more or less, and she has no visible means of propulsion. Upon inquiry we heard that she was modeled after a wash tub "forard" and a catamaran aft, and that her single paddle wheel was exactly amidships. But she is a first-rate excursion boat, notwithstanding her peculiarities.

At the Davis Island improvements only a much, and it must be conf.

Leaving the dam, the party returned up stream until the Superior Iron Mill, operated by A. Kloman & Sons, was reached. There the party witnessed the rolling of eye bars on Kloman's new universal mill, which was fully illustrated and described in The Iron Age of April 24, 1879.

From Kloman's mill there was a "go-asyou-please" walking match to the car-wheel foundry and machine shop of John L. Gill, Jr., a little above. Mr. Gill's testing ma chine, illustrated on another page, was the special object of interest here. The boat followed the excursionists to this point, and after inspecting the machine referred to, all came a board again.

The next stopping place was the outside edge of a flotilla of coal barges, across which it was necessary to pass to reach the works of Messrs. Lewis, Oliver & Phillips. The programme included a stop first at Dilworth, Porter & Co.'s mill, further down, but a landing could not be effected there and, as a consequence, the excursionists were compelled to walk through the scorching noonday sun to the latter mill. Here, in an atmosphere compared to which that outside was delightfully cool and refreshing, the method of making railroad spikes by machinery was thoroughly investigated. Lewis, Oliver & Phillips' mill was then visited, and a look taken at the bar iron rolling.

Returning to the boat, a welcome lunch was discussed while passing through the lock to get above dam No. 1. Chess, Smythe ing of tacks being the special feature of in-

Crossing to the north side again, the party went through the copper-rolling works of C. G. Hussey & Co., near the new gas works. Although the heat was intense in some parts of the works, the ladies as well as the gentlemen stood it bravely, and saw everything that was to be seen.

The American Iron Works of Messes Jones & Laughlin received the next visit, where hot bar rolling, cold shaft rolling, &c., were eagerly inspected. Although quite a long stay was made at these works, it could scarcely be said that everything was seen, the mill and adjuncts being so ex-

The last manufacturing establishment visited was that of Anderson & Co., which is noted principally for rolling steel wire used in making wire cables. After inspecting these works the little boat steamed up to Glenwood and returned to the Monongahela Wharf, reaching there about 6 o'clock. Despite the very warm weather the excursion was a delightful one, and gave a good idea of a portion of Pittsburgh's industry.

We nesday's Ev-ning Session.

The evening session was largely attended, it being understood that the discussion of Dr. Dudley's papers on steel rails would be resumed, and that a lively debate of great cientific interest might be expected.

The proceedings were opened with a pa-per by Mr. Wm. Metcalf, describing some blackboard illustrations of the Swingell gas furnace, now in successful operation at the Crescent Steel Works. We postpone a description of this furnace until a more convenient opportunity shall offer.

Dr. Raymond followed with some remarks

on the operations of the Salisbury apparatus for burning coal tar, in operation at Trenton.

The discussion on Dr. Dudley's formula for steel rails was begun by a paper by Mr. Cloud. Capt. William R. Jones, of the Edgar Thomson Steel Works, also read a paper, in which much solid scientific fact was so blended with playful humor, that the Institute gave itself up to the most uproarious mirth. Having been at some trouble to ecure a stenographic report of this discussion, which will be given in these columns as soon as it is ready for publication, we will not give it further space in this corrre-

Mr. Geo. W. Maynard, the representative in this country of Messrs. Thomas and Gilchrist, had intended to present to the Institute the paper read by Mr. Thomas before the recent London meeting of the British Iron and Steel Institute, but owing to its failure to come to hand as expected, he was forced to substitute, unprepared, a summary of the data thus far published. Since then both the communication of Messrs. Thomas and Gilchrist, and that of Mr. Snelus (which was spoken of by Dr. Raymond at the meeting) have arrived, and as our readers will find on another page careful abstracts of these papers, giving the latest information, we omit further reference to the remarks made by Messrs. Maynard and Raymond.

Thursday's Entertainments.

All of Thursday was given up to the excursion of the day and the reception in the evening. The excursion was over the Allegheny Valley Railroad, a special train leaving the Union depot about 9 o'clock, with something over 100 members of the Institute aboard. The first stop made was at Wilson, Walker & Co.'s mill, and the next at the Union Iron Mills. At Fortythird street a stop was made long enough to allow the excursionists to cross the bridge to Allegheny and examine the iron mill of Graff, Bennett & Co., where natural gas, brought 20 miles from Butler County through brief stop was made. Lieut. Mahn, in charge, showed the visitors every attention, of Miller, Metcalf & Parkin, the Keystone but they could not stay long enough to see Bridge Works and the Lucy Furnace were next xisited.

Before resuming the trip a lunch, set out in the forward car, was partaken of. The next place visited was the Standard Oil Refining and Barrel Works. This is the second largest establishment of the kind in the world, the product being 4000 oil barrels per

The Brilliant Oil Refinery and the new water works at Negley's Run were then inspected. The pumping works excited more interest in the visitors than anything before een in this city, or anything they are likely to see. The general opinion seemed to be that the pumping engines were the most extraordinary pieces of machinery to be found anywhere. A few unguarded remarks of this character led the local reporters who hovered around to hear what was said, to form very crroneous conclusions as to what the opinion of the visiting engineers really was. As these comments were evidently not intend d for the public ear, we refrain from repeating them.

Leaving the water works, the Allegheny Valley Railroad shops were inspected; also, the tool works of Metcalf, Paul & Co.. and, on the return trip, the steel works of Hussey, Howe & Co.

THE RECEPTION

in the evening at the house of Mr. William P. Shinn, in one of the delightful east end suburbs of the city, was a brilliant success in all respects. The attendance included all the visiting members, all the ladies of the party, and a large representation of the local membership and the ladies of Pittsburgh,

[Continued on page 29.]

INDUSTRIAL ITEMS.

NASSACHUBETTS.

The manufacture of table cutlery is to be taken up at Shelburne Falls by a new company, who have leased a room and power of Richmond & Merriam for the purpose. The machinery has been purchased, the fitting up begun, and the company, who are all practical workmen, expect to be under way early in June.

CONNECTICUT.

The Farrell Foundry and Machine Com-pany are running their works at Ansonia day and night.

The fact that the store-rooms of the Meri-

The fact that the store-rooms of the Meri-den Flint Glass Company were overstocked, which will necessitate the closing of their factory for a month or six weeks, gave rise to the rumor last week that the company were about to shut down indefinitely, which rumor is wholly untrue, as far as learned at present.

NEW YORK.

The new works of the Horicon Iron Company at Ticonderoga are in active operation.

The American Graphite Company, who derive their supplies from extensive beds of plumbago in the vicinity of Ticonderoga, are busily engaged in preparing large quantities of black lead for the market. The other industries of the town are in a prosperous

The iron works at Syracuse have been running on half time for the past twelve

The Crown Point Iron Company will blow

in in about a week.

The Madden & Cockayne File Company

The Madden & Cockayne File Company have exchanged their property for the unused horse-nail factory property, which was owned by the Monhagen Saw Works firm—the Wheeler, Madden & Clemson Manufacturing Company. The object of the change is to give room for the file works to enlarge. The factory has occupied its present location for a number of years. The business has flourished far beyond the expectations of those who founded it, and its present quarters have been found too small for it. The removal will afford an opportunity to enlarge, and at the same time to arrange the The removal will afford an opportunity to enlarge, and at the same time to arrange the works on a more convenient and enlarge, and at the same time to arrange the works on a more convenient and systematic basis. A pair of new buildings will be erected, each 76 feet long. One will be 21 feet wide and two stories high, to be used as a file-cutting shop, and the other 25 feet wide, for a grinding shop. The forging will be done in the nail factory building. A large new engine has already been purchased for the new file works, which will enable them to start with less stoppage of business than if the old engine was to be removed with the other machinery. The erection of the new works will be pushed to completion the present season. To what use the buildings works will be pushed to completion the present season. To what use the buildings to be vacated by the file company will be put is not known. It would be a desirable location for almost any manufacturing purposes. By securing this property the saw factory company have an opportunity to build a switch in connection with the Midland Railroad, on which to run in Lehigh Valley coal, if desired.

NEW JERSEY

Reports from Riegelsville denote a brisk business in her manufacturing interests. Taylor & Corser, makers of machine knives and "Standard" parallel iron vices, are running their works on full time. Cooper & Hewitt's iron furnace, situated on the Pennsylvania side of the river, is about to go in blast.

Warren Foundry and Machine Co., Phillips warren roundry and Machine Co., Phillips-burg, have been very busy up to the present time, employing over 350 hands. Just now orders are not quite so brisk, but the dul-ness is not likely to be very protracted. Lippett & Wood, boiler makers, &c., Phillipsburg, make a similar report to the

Phillipsburg, make a similar report to the above, but they have numerous inquiries, and expect to enter some important orders at an early date. Drinkhouse & Weaver, Phillipsburgh, are

very busy. Among other orders they have one from the Andover Iron Co. for 60 pig iron and cinder trucks; another for grate bars for the Lehigh Zinc Co., besides a variety of miscellaneous work, chiefly local.

PENNSYLVANIA. The Lehigh Zinc Co., of South Bethlehem, will start up two or three of the furnaces in the oxide works, to work up some ore on

J. Dutton Steele & Co., of Pottstown, are about to ship to Brazil a large lot of sad irons. They will be placed in 50 boxes, each box to weigh, with its contents, 150 pounds. They are made in such and 18 inches long. shape for transportation over the Andes on the backs of mules.

The Reading Iron Works, the furnaces, the Hardware Works, hat manufactories, foundries, forges and other industrial estab-lishments in that city are all going, and have numerous orders to fill. The outlook from private works is very good, and numerous establishments are working from 7 in the

morning until 6 in the evening.
"Tubal Cain," in the Sharon Herald of "Tubal Cain," in the Sharon Herald of the 16th inst., says: For the week ending May 10: In Sharon, at the Westerman Iron Works, puddle, sheet, hoop and guide mills double turn; the hoop mill lost two nights and the guide mill one, but the intent was double turn. Bar mill single turn, plate mill one-fourth overtime, nail factory and spike machines on, chain factory full fires, full time, full order books. In Sharpsville things are looking better than at any time since 1870. At the Mount Hickory Works Furnace No. 2 averages 35 tons a day of a very superior brand of iron.

Stewart & Co., South Easton Wire Works, report business very active, and are running

report business very active, and are running all their mills on full time, giving steady em-

all their mills on full time, giving steady em-ployment to a large number of hands. Sleicher, Schumm & Co., Philadelphia, re-port a steadily increasing demand for the new "Otto" Silent Gas Engine. For many pur-

orts a steadily increasing demand for the new "Otto" Silent Gas Engine. For many purposes there seems to be no doubt that these engines are giving entire satisfaction.

McCaffrey & Bros., Pennsylvania File Works, report business very active. Their sales in the United States show a steady increase, and the prospects of a foreign demand are quite encouraging. This firm has recently shipped files in considerable quantities to the Mediterranean and Black Sea ports.

Wilson Bros., Easton, are quite busy in their foundry, and among other orders have one from a New York hardware firm for 75 tons sash weights. W. M. Kaufman & Co. have leased the

W. M. Kaufman & Co. have leased the Kutztown Furnace, to be known as No. 4 Sheridan. Nos. 1 and 2 are running on Bessemer iron. No. 3, formerly the Topton Furnace, was put in blast last week on foundry iron, and No. 4 is in course of preparation and will probably be put in blast soon after midsummer.

PITTSBURGH AND VICINITY Anderson & Co. are running full handed. The National Tube Works find all the

The National Tube Works and all the work they can attend to.

Duncan & Sons, of the South Side, are in full operation, and are turning out some very fine pressed glasswork.

The old Blair Iron and Steel Works, at

Glenwood, are now in operation. The first steel was to be made last week.

It is expected that the new rolling mill at McKeesport will be in operation next month. Preparations for resuming operations at hmsen & Co.'s glass works are still in pro-

The old firm of Bryce, Walker & Co. has been dissolved, the senior member retiring It is stated that Mr. Bryce and his son wil build a new factory at Homestead, strong inducements having been offered by the Homestead Bank.
Chas. L. Caldwell has disposed of his interest in the Black Diamond Steel Works to Richard C. Gray. The firm name will remain as heretofore—Park, Bro. & Co. Homestead Bank.

WEST VIRGINIA. West Virginia is now supplying quite a large amount of the coke used by the Ohio River furnaces. The coke is shipped by rail to Huntington and thence by barges. The Norfelk Furnace is getting 300 tons weekly, the Belfont and Sarah a like quantity per week, and the Etna Works are just making a contract for 1000 tons this month and 1000. a contract for 1000 tons this month and 1000

At Quinnemont Furnace 80 coke ovens are in blast, with 70 men at work in the coal mines; the furnace is also in successful operation. The works employ about 300 en at present.

The open-hearth steel furnace of the Portsmouth Burgess Steel Works had to be relined last week.

Lawrence Furnace blew in on the 4th.

Lawrence Furnace blew in on the 4th.
Belfont Furnace is out for repairs.
Grant Furnace was blown in on the 12th
and is doing well. She has on hand, at the
furnace and at different points on the Iron
Railroad, 8000 tons of ore, and will receive
about 1500 in addition from the Center
Furnace tract.

Furnace tract.
Mr. J. H. Van Dorn, of the Cleveland Wrought Iron Fence Works, has in hand the ironwork of a new vault at Norwalk, Ohio, which is to be one of the best in the State. The outside door is made in accordance with Mr. Van Dern's method of constructing jail doors. The inside door is made of chrome steel. Mr. Van Dorn has also some 10,000 feet of his wrought iron fence under con-tract, which is now being set up mostly in Ohio and Michigan; also, 600 feet of very heavy and expensive fence for a gentleman in New York State, costing over \$2000. Mt. Vernon Furnace is in blast.

When a Hanging Rock Furnace when a langing Rock Furnace owner cannot make money in pig iron he turns to something else. Center Furnace, which has been following the pastoral pursuits of Grangerism ever since hard times set in, and is now grazing 120 head of cattle, has just commenced digging iron ore, paying \$1 per ton. The ore is to be shipped to and used at Grant Furnace. at Grant Furnace.

The Missouri Furnace Company blew in another stack on the morning of the 8th, and have since blown one out. They are blowing three stacks in all. Most of the product goes to the Bessemer Works at Joilet, Ill.

We learn from the Depere News that the National Furnace in that place turned out III8 gross tons of pig metal in the month of April. The furnace is 48 x 12.

The Iowa Steel Barb Wire Company, of Marshalltown, have lately added improved machinery to their works.

The Murray Iron Works at Burlington are to build an addition to their establish-

Journal, is the statement of shipment of iron ore from the port of Escanaba, Lake Superior, for the season of 1879, up to and including May 7, in gross tons:

1	. Jackson	12
1	Tone Wash	64
1	lew York 2	.37
1	leveland	15
ı		13
1	Barnum	
ı	alighteer	65
ł	alisbury	72
ı	fichigamme r,	.88
ı	uperior, H	94
I	uperior hem	28
ı		
ı	alon	43
I	ulcan r,	II
ı	uinnesec	44
ı		07
ľ		
ı	managed	52
ı	mmett 1,	II
ľ	orway z,	54
ı		30
ı		3"
ı	Total19,	
ı	Total 19,	21
	Of 41 11 + 4 1	

Of the 17 blast furnaces on the Upper Peninsula, but five are now in blast, with no prospect of an additional number being blown in in the immediate future.

KENTUCKY.

The Princess Furnace remains cold, and there is no probability of her starting up again until a vexed partnership question is

will not commence before late in the fall.

Special Notices.

Patent American Hurdle Fence.

This Fence commands a ready sale, and may be made a valuable adjunct to the business of Rollin

Mills suitably located. Address

J. B. WICKERSHAM, 913 Cherry St., Philadelphia

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37 Park Row, New York. PARK BENJAMIN, Ph. D.,

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Factories fitted up. Selection and purchase of Laundry Machinery and Supplies.

REMOVAL.

New York, May 1, 1872.

To our Customers and Correspondents: We have removed our stock of Wire Nails, Escutcheon Pins, Shoe Nails, Shoe Tacks, Steel Shanks, and all our Shoe Finding Articles, to the store of J. K. Krieg & Co., No. 39 Warren street, where our Mr. J. F. HOBART will be located, and prepared to fill all orders for the above-named goods with dispatch.

fill all Orders for the OLD COLONY RIVET CO.
The agency for the OLD COLONY RIVET CO.
will be continued at the old stand, 116 Chambers st.
Orders for Tacks, Nails, &c., for the Hardware,
Saddlery, Upholstery and Export Trade will be
forwarded to the factory from No. 39 Warren
street by mail, or our telegraphic cypher, where
they will be promptly executed, at lower prices
than can be afforded from a New York warehouse.
Soliciting a continuance of your valued orders,
we remain, yours truly,

DUNBAR, HOBART & WHIDDEN.

Manufacturing Business FOR SALE.

will purchase one-half interest, with pos tion and liberal salary, in a stock company manu-facturing metal goods in large city. Have done a good business through the hard times of past five years and now show increasing trade. Have a good reputation and established for 12 years. A good chance for live man. Will afford full investigation and give reasons for sale,

Address, with name, B. C.,
Office of The Iron Age, 83 Reade St., New York

To Steel Manufacturers.

An energetic young man with scientific training, who has had experience in the manufacture of Bessemer and Crucible Steel, in preference to remaining unemployed would be willing to take a subordinate position, with the prospect of being employed as blower in Bessemer or as melter in Siemens-Martin steel works. Highest recommendation as to integrity, character and ability furnished. A correspondence, which shall be strictly confidential, respectfully solicited.

Address A. I. F.,

33 West 35th St., New York.

TO LARGE CONSUMERS of fine light

Malleable and Gray Iron Castings. We can offer special inducements in the way of very superior quality guaranteed, and at fair prices. Being ourselves large consumers and re-quiring the most perfect castings, other work is ensured the same attention.

MALLORY, WHEELER & CO., New Haven, Conn.

ASSIGNEES' SALE.

DOBELMANN FLINT GLASS WORKS, Nos. 202 to 214 Plymouth street, Brooklyn. Factory, Tools, Implements, Machinery, &c., all complete. Will be sold at public auction on the premises, on the 21st day of May, 1879, at 12 M. Terms easy. By order of JOHN G. WALSH, Assignee of J. B. Dobelmann. THEO. GOERCK, Assignee of Dobelmann Flint Glass Co. For information apply to THEO. ARNOLD, 67 Wall street, N. Y.

For Sale.

Stock, fixtures and trade of a Hardware, Pain The following from the Marquette Mining and Oil Store in a manufacturing town in south ern part of Massachusetts, 32 miles from Boston. Will sell at a reasonable price for cash. Inquiries should be directed to

Office of The Iron Age, 83 Reade St., New York. LEHIGH UNIVERSITY .- TUITION FREE.

Civil, Mechanical and Mining Engineering; Chemistry and Metallurgy; Full Classical Instruc-tion; French and German; English Literature; International and Constitutional Law; Psychology and Christian Evidences. For Registers address The REV. JOHN M. LEAVITT, D. D., President, Bethlehem, Pa.

WANTED.—A first-class Bookkeeper is open to an engagement; has had full charge 13 years of large Jobbing Hardware House. Firm going out of business. Thoroughly reliable and competent. References as to capacity and integrity A1. No objection to leave the city.

Address,
Office of The Iron Age, 83 Reade St., New York

EDWARDS' AMALGAMATED STEEL AND IRON PROCESS EDWARDS' AMALGAMATED STEEL AND IRON PROCESS For utilizing Old Steel Rails. Car Springs and Wrought Iron Scrap. Equal to Charcoal Iron. Stands test of 65,000 to 70,000 pounds per square inch. Railroad companies having large quantities of old steel and iron scrap can save 20 to 25 per cent. by manufacturing their waste material for bridge and railroad purposes. Having a practical knowledge of the iron business, would like to manufacture for some responsible company on favorable terms. For terms and license on royalty, address Box 350, Columbia, Lancaster Co., Pa.

For Sale.

The machinery complete of the Chicago Plate and Bar Mill Company, all in first-class order Will be sold very cheap. Terms easy. Address, J. M. AYER.

72 Washington Street, Chicago, Ill. WANTED.—Consignments of Machinery, on commission, in large new store near Liberty street. Superior advantages. No charge for stor-age, Address P. O. Box 1019, New York. Special Notices.

SECOND-HAND TOOLS

One Putnam Gear Cutter. 36 in.
One Wood & Light Milling Machine. No. 8.
Three Lincoin Pattern Milling Machines
One Smith & Gavrin No. 3 Miller, new.
One Pond Index Milling Machine.
Two Smith & Gavrin Hand Milling Machines.
One Pond Index Milling Machine.
Two Smith & Gavrin Hand Milling Machines.
One Pond Index Milling Machine.
Two Smith & Gavrin Hand Milling Machines.
One Smith & Gavrin Hand Milling Machines.
One as the Pratt & Whitney 2, and 3, Spindie Drills.
Two & Spindie Drills.
Two & Spindie Profile Machines.
One as in. Upright Drill.
One 30 in. Upright Drill.
One 30 in. Upright Backines.
One Ames Jigging Machines.
One Ames Jigging Machines.
One Ames Jigging Machines.
One Ames Jigging Machines.
One as in Sin x 12 ft., new.
One in 16 in. x 6 ft., Fideld.
One in 16 in. x 6 ft., Fideld.
One in 17 in. x 26 in. A mes.
One in 18 in. x 10 ft., Food order.
One in 19 in. x 26 in. A mes.
Hand Lathes, from 7 to 15 in. Swing.
One Planer, 38 in. x 7 ft.
One in 30 in. x 7 ft., Perris & Miles, new.
One in 24 in. x 7 ft.
One in 24 in. x 4 ft., good order.
One in 24 in. x 4 ft., good order.
One in 18 in. x 16 ft., Ferris & Miles, new.
One in 18 in. x 16 ft., Ferris & Miles, new.
One in 19 in. x 4 ft., good order.
One in 19 in. x 4 ft., good order.
One in 10 in. x 4 ft., good order.
One in 10 in. x 4 ft., good order.
One in 10 in. x 4 ft., good order.
One in 10 in. x 4 ft., good order.
One in. x 4 in. x 4 ft., good order.
One in. x 4 in. x 4 ft., good order.
One in. x 4 in. x 4 ft., good order.
One in. x 6 in. Oorliss Hor. Engine.
In x 4 in. Oorliss Hor. Engine.
In x 4 in. Greene Cut off Hor. Engine.
In x 4 in. Greene Cut off Hor. Engine.
In x 4 in. Greene Cut off Hor. Engine.
In x 2 in., Greene Cut off Hor. Engine.
One in. x 4 in. Greene Cut off Hor. Engine.
One in. x 4 in. Greene Cut off Hor. Engine.
One in. x 4 in. Greene Cut off Hor. Engine.
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One in. x 4 in. Greene Cut off Hor. Engine.
One in. x 4 in. Greene Cut off Hor. Engine.
One in. x 4 in. Greene Cut off Hor. Engine.
One i

Second-Hand Steam Hammers and Forge Tools. One 2000 lb. Ferris & Miles Steam Hammer.
One 3000 lb. Merrick Steam Hammer.
One 500 lb. Steam Helve Hammer for Axles.
One 500 lb. Steam Hammer, Ferris & Miles.
One pair Heavy Shears for Scrap.
One Axle Centering Machine.
One 48-inch Fan Blower.

E. P. BULLARD,

14 Dey Street, New York. PANAMA "STAR AND HERALD

LA ESTRELLA DE PANAMA,

PUBLISHED WEEKLY AT PANAMA. The principal commercial journals and BEST

ADVERTISING MEDIUMS in Spanish America.

ADVERTISING MEDIUMS in Spanish America.

These papers have been regularly published since 1849, and have subscribers in about 275 towns and cities in South and Central America, Mexico and the West Indies.

American manufacturers desirous of export trade can find no better medium through which to reach the BUSINESS COMMUNITIES of those countries, as no journals, either from England or the United States, have so extensive circulation on the Pacific Coast.

on the Facilic Coast.

Monthly Supplements to La Estrella de Panama are published, and are intended to give advertisers an opportunity of describing, by illustrations and in detail, their goods, with price lists, &c., and to serve in this respect as a catalogue, at a mere minimum of expense to them, and with the absolute certainty of distribution to all the subscribers of both journals.

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Special Notice.

The undersigned offer their services as Agents to nakers of American Cabinet Hardware. They keep a full line of UPHOLSTERERS' AND CABINET MAKERS' MATERIALS. LOUIS WINDMULLER & ROELKER,
20 Reade St., New York.

Address in Frankfort-on-Main, Germany, ERWIN ROELKER. TO MANUFACTURERS AND CAPITALISTS.

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A new article of light wire, recently patented Patent offered for sale. Correspondence solicited

J. H. PLUMMER, 1276 Pacific Street, Brooklyn, N. Y.

For Sale.

One Ferris & Miles Steam Hammer, two-ton, 77-inch cylinder, 48-inch stroke, used six months good as new. Address

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TO THE HARDWARE TRADE.

WANTED-A position as salesman; 15 years' experience. Thoroughly competent to buy and sell. Highest references as to character and busi-

HARDWARE, 62 Barrow St., New York.

For Sale.

15x₂₄ Wm. Wright Engine, 15x₃½ foot Pitkin Bro. Boiler, With fixtures complete, nearly as good as new Can be seen in operation at our factory

STILES & PARKER PRESS CO.,

WANTED.—POSITION AS ROLLING MILL MANAGER.—A gentleman possessing a thorough practical knowledge of duties required, and with long and ample experience, desires a position as superintendent or manager of a rolling mill. For references and particulars address E. S. WHEELER & CO., 54 Cliff street, New York.

For Sale,

One Vertical Engine, 16x20 inches, 8 ft. Band Wheel. One 40 h. p. Tubular Boiler. One 80 h. p. Wiegand Boiler. Can be seen running at our works, Tacony.

HENRY DISSTON & SONS,

Philadelphia. SITUATION WANTED.—Would like to Scorrespond with Stove Manufacturers relative to a position as traveling salesman. Have had 20 years experience in sale to retail trade and two seasons on the road. Perfectly conversant with stoves. Age, 42 years. Satisfactory reference can be furnished if required. Salary to be governed by competency. Address E. H. Ps. Office of The Iron Age, 83 Reade St., New York.

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Special Notices.

One 9-inch Train Bolls,
One 16-inch Train Bolls,
Both with Housings,
One Steam Hammer,
One Pair Shears,
One Lot Steel Ingot Molds,
Three Large Woodward Steam
Pumps,
Three Small Steam Pumps,
Two Hoisting Engines,
Three Steam Bollers,
One Lighthall Condenser,
One Surface Condenser,
on Surface Condenser,
K Pumps, Low Pressure Gauges,
Registering Gauges, &c.

FOR SALE LOW BY

DANIEL W. RICHARDS & CO.,

Scrap Iron & Metals, 88 to 96 Mangin St., New York,

The Sherman Process Co. 9 Pemberton Square, Boston, Mass., Issue Licenses to use the Process for the

Manufacture of Iron and Steel n the Bessemer Converter, Crucible, Siemen Martin, Puddling, Blast and Cupola Furnaces. The use of this Process improves the quality of the product, saves fuel and labor, and does not re-quire any change in furnace or manner of works. See page 17 of The fron Age of Oct. s5th, 1377.

AUSTRALIA AND NEW ZEALAND,

Wm. S. Fell & Co.,

Importers and Auctioneers, No. 275 George St., Sydney, Australia, No. 275 teorge St., Sydney, Amstralia, Request correspondence with American manufacturers desirous of being represented in the Australian Colonies or New Zealand.

Consignments solicited and prompt attention promised, and 60 day drafts against same for 50 per cent. through Bank of British North America New York City, will be honored.

All the principal points in the Colonies are visited regularly by our travelers

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Counting House Edition (former price, \$3), size, 9x11 inches, Cloth Bound, large type, \$2.

Pocket Edition (just issued), size about 4x5 inches, Cloth Bound, small type, \$3.

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Sent postpaid to any address on receipt of price. Currency may be sent by mail at Publisher's risk. Address,

S. H. JENNINGS,

Price Books.

BUELL LAMBERSON, No. 97 Chambers Street, - New Yerk.

These books may also be had at publishers' prices of WM. BLAIR & CO., Chicago,
A. F. SHAPLESGH & CO., St. Louis, and
R. W. BOOTH & CO., Cincinnati, O.

Rolling Mill,

Of 10 tons capacity, steam and water power, for making small iron, with power to draw wire rods, on Delaware and Hudson Canal, within 100 miles of the city of New York; for sale or for rent, with low prices to suit the times. Apply to

JOHN W. RUSSELL.

104 Broadway, New York.

For Sale Cheap. A new No. 5 GEARED PUNCHING PRESS, Stiles & Parker's latest pattern, in perfect order Illustrated in this paper March 20, 1879.

B. D. WASHBURN & CO., Boston.

Bissell & Welles, Wholesale Hardware Auctioneers,

83 Chambers and 65 Reade Sts., N. Y. Sales held weekly for the trade. Consignments olicited. We refer to the leading Manufactur

CALIFORNIAN AGENCY.

A San Francisco firm of File and Tool makers ag an agent constantly travel consumers in the State and West Coast, is desirou of representing some first-class Eastern Houses in the manufacturing hardware trade. Address AGENCY, 248 Beale St., San Francisco, Cal.

THE IRON LINE. For the transportation of

IRON, IRON ORE, COAL, &c., Between Lake Champlain, New York, Philadel phia, Pa., Wilmington, Del., and intermediate places. For Freight apply to F. W. STARK, 33 Coenties Slip, New York. JOSEPH PHILBRICK, 1201 Beach st. Phila., Pa.

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Great bargains offered to the trade.

A. W. WHEELER,

141 Lake St., Chicago, Ill. HARDWARE BUSINESS FOR SALE. HARDWARE BUSINESS FOR SALE.
The stock and store in a fine town in Westers
New York; established over 25 years. Store 8
very handsome one, in perfect repair, and bulk
expressly for the business. The stock is an exceptionally good and clean one, has no poor goods
and will invoice about \$4000. Good reasons will
be given for selling. To a good party a recchance is here presented to secure at once a fine
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To Capitalists and Manufacturers.

Forty thousand dollars (\$40,000) will purchase controlling interest in the stock of one of the largest and most prosperous manufacturing of abilishments in Ontario. Five-proof Safes, wood and Iron-working Machines. Machinery nearly new. Established reputation, and good basises connection. Capacity, \$200,000 per year.

Address,

MANUFACTURER,
P. O. Box \$9, Hamilton, Osk.

Trade Report.

The past week has been a notable one in financial circles. A speculative mania has manifested itself in a very marked degree, and securities and shares of all kinds and descriptions have been strong. It would descriptions have been strong. It would seem that anything in the shape of share certificates can be floated at the present time, so strong is the speculative craze. In speculative stock market it makes difference even if large speculators sell out, their places being taken by the crowd and prices advanced at the same time. The speculative tendency appears to be as great and schemes are as easily floated as at any time in many years. This state of the market is in some measure the result of the displacement of the large amount of money which has been invested in called bonds. There has been a general advance in stocks and bonds. The telegraph stocks have advanced upon rumors of increased dividends, the coal stocks upon the talk of another combination, made possible by Judge Packer's death, and the Western stocks on reports of favorable crops. Some others have advanced for no assignable reason. In the money market call loans are 3 @ 4%, except upon United States bonds, where the quotation is 2 @ 21/2%. Time loans are 21/2 @ 31/2 %. Prime mercantile paper is 31/2 @ 41/2 %.

Government bonds are from 1/3 @ 3/8 higher for the whole list of uncalled bonds, 8t. the largest rise being in the 4s and 41/2s. Standard. The sale of the 4 per cents. continues upon an enormous scale, and upon this account the Syndicate have again advanced the price. The market was reported stronger yesterday at 1031/2 @ 1037/8; on the previous day it was 103 @ 1031%. All old bonds are now well up to a 5 @ 6% premium standard. We give below quotations at the close.

Premium stocks, like Rock Island, N. Y. Central, C. B. & Q. are steadily advancing. and railroad bonds, which have been regarded as assured income investments, are largely bought by those who are willing to take a moderate speculative risk. This is done in the belief that they will become

The bank return shows a decrease of \$5,779,375 in surplus reserve, which now ds at \$10,308,625, against \$14,128,775 at this time last year, and \$17,643,550 at the corresponding period in 1877. The loans show an increase this week of \$10,896,900; the specie is up \$18,300; the legal tenders are decreased \$4,425,800; the deposits other than United States are up \$5,487,500, and the circulation is down \$2600.

The following is an analysis of the bank

Loans	May 10.	May 17. \$253,838,500	Inc.	parisons. \$10,896,900	4
Specie	18,745,600	18,763,900	Inc.	18,300	l
Legal t'nd'rs		49,150,900	Dec	4,425,800	ı
Tot. reserve.		67,914,800	Dec	4,407,500	ı
Deposits Reserve re-	224,937,200	230,424,700	Inc.	5,487,500	ı
quired	56,234,300	57,606,175	Inc.	1,371,875	ı
Surplus	16,088,000			5,779,375	ı
Circulation.	19,688,000	19,685,400	Dec	2,600	ı

The foreign trade movements at the port of New York since our last issue are shown in the following tables:

For	the	week	ended	May	17
					-

Dry goods General mdse	#877. \$912,388 4,693,396	1878. \$850,060 3,081,746	1879. \$1,368,753 4,278,713
Total for week. Prev. reported	\$5,605,784	\$3,931,806	\$5,647,466 xx5,200,436
Since Jan. r	8728.820.644	\$112,722,127	\$120.847.002

Included in the imports were articles of to Black, Enameled and Galvanized Pipe merchandise valued as follows:

Qu	antity.	Value
Brass goods	32	\$1,795
Bronzes	10	1,332
Chains and anchors	10	591
Copper		513
Cutlery	73	20,186
Gas fixtures	3	1,199
Guns	93	10,836
Hardware	5	583
Iron, pig, tons	300	4.219
Iron, sheet	27	2,613
Iron ore, tons	1,382	5,106
Iron, other, tons	1,370	26,472
Lead, ton	I	118
Metal goods	120	16,441
Nails	8	3,534
Needles	10	5,068
Nickel alloy	3	853
Old metal	*****	3,630
Plated ware		219
Percussion caps	70	6,751
Saddlery	5	530
Steel	.2,379	19,534
Spelter	05,519	7,274
Silverware	*****	198
Silver ore	5	50
Tin, 3,897 slabs30	4,553	172,357
Wire.	2,370	2,280
Zinc	9 009	
	0,050	1,312
EXPORTS EXCLUSIVE OF SE	more.	

For week ended May 20:

For the week Prev. reported	1877. \$5,518,535 96,353,476	1878. \$7,069,472 126,632,598	1879. \$5,697,932 115,426,303
Since Jan, 1	101,872,011	\$133,702,070	\$121,124,235

	was i andia 33
EXPORTS OF SPECIE.	
For the week ended May 17:	
Total for the week Previously reported	\$593,665 7,155,311
Total since January 1, 1879	
The closing quotations of Gov bonds were as follows:	

Tr o -	Bid.	As
U. S. Currency 6's	12436	.1
U. S. 6's 1880 registered	106%	2
U. S. 6's 1880 coupon.	106%	1

II 9 612-00- 00-00-0	
U. S. 6's 1881 coupon	1075
U. S. 5'8 1881 registered	1041
U. S. 5's 1881 coupon103%	1047
U. S. 41/2's 1891 registered 1061/2	1063
U. S. 4%'s 1891 coupon	108
U. S. 4's 1907 registered 103%	2035
U. S. 4's 1907 coupon 1033	1033
The following were the closing quo	tation
of active shares :	
Bid.	Asked

nerican District Telegraph 00%	OI
lantic and Pacific Telegraph 40%	403
ston Air Line 43	432
rlington and Quincy 117%	1177
r., Cedar Rapids & North 36%	365
nada Southern	60
nton	45
L, Unicago and Indiana Central 6%	05
v., Col., Cin. and Indianapolis 53	#3½ 96¾
veland and Pittsburgh 95%	90%
icago and Alton84	843
Tick,	
icago, St. Paul and Min 28	297
laware, Lack. and Western 57% laware and Hudson Canal 48%	57%
press—Adams107	108
A Therican	
46 United States	4934
** American 49 *** United States 48 ** Wells, Fargo & Co. 99 *** Wells, Fargo & Co. 99	0034
9	99%
rt Wayne	1125
rlem	100%
nnihal and St. Joseph	201/
nnibal and St. Joseph 20 Pref. 41 1/4 mestake	42
mestake	35
nois Central87	873
nsas Pacific 57	87 14 58 34
nsas and Texas	17%
ke Shore	743
aisville and Nashville 68	6834
chigan Central 81	813/
rris and Essex gr	913
w York Central119½	130
w York Elevated37	****
w Jersey Central	487
rthwest	633
	95
io and Mississippi	15
Pref 3812	39%
cific Mail 14%	15
nama149	150
cksilver	15%
	42
ck Island and Pacific	x39%
Louis Kansas City Northorn	15%
Louis Kansas City Northern 1514	423/4
	10%
Louis and San Francisco 10%	12%
Paul	485
16 Prof 20	485
A101	3974

u Union Telegraph...... 38 GENERAL HARDWARE.

Although with the near approach of the warm season the volume of business is gradually tapering off, few complaints of dullness are heard, and the general belief is that, considering the season, the trade in General Hardware is altogether satisfac-

The business in Foreign Hardware is variously reported, some houses seeming entirely satisfied with the amount doing now, and more than satisfied with th aggregate so far of the business of 1879, while others speak despondently.

Few changes in values are reported, and none of importance.

The demand for Nails is satisfactory, and the stocks in this city are unusually light. So far as we can learn the card rate is fully lived up to, and we hear of no transactions at better agures than \$2.25 net for rod. as a basis.

The Ohio Manufacturing Company, totals of this week compared with that of Cleveland, Ohio, have issued the following last week:

Cleveland, Ohio, have issued the following price list and terms for the "New Ohio" Lawn Mewer" manufactured by them.

	TH	B 36	EW	-	E	II(0	L	A	W	N	8	W	rc	7	35	L,	-	P	B	I	Ų	8	L	I	75		
	inch																											
34	66																						6.6				20.	00
16	66	44																									22,	00
30	ma	ch	ine	P	0	r	re	36	ı	t		d	h	80	20	e	ırı	it	,	6	C	n	c	la	15	18	80	LÍ

chines purchased during the season.

We will furnish a sample machine to responsible dealers on trial, and if it fails to give satisfaction it may be returned at our

The National Tube Works Co., Nos. 104 and 106 John street, have issued, under date of 19th inst., a card in which they say : "On and after this date our discount on Wrought-Iron Pipe will be 60 to 65 per cent. List March 15, 1876. This discount applies

Smith Bros., Fort Madison, Iowa, have issued the following circular, price list and discounts for Stewart's Patent Detachable-Bottom Sieves for the season of 1879:

We herewith present to you our new price list for Stewart's Patent Detachable-Bottom, We have, at a large ex pense, put in new machinery for the manu-facture of the Stewart Sieve, which and facture of the Stewart Sieve, which enables us to make a much better article than we have heretofore made, and also enables us to furnish you with a great deal better article for the same money you pay for an inferior old-style Sieve.

In the Stewart Sieve you have the follow ing advantages: It does away with the necessity of having a separate sieve for every purpose, by having one hoop or body, which will last an ordinary lifetime; you can have any number of bottoms—coarse for fruit, fine for flour and medium for meal; or in case one bottom wears out, it can be replaced at a trifling expense and save the cost of a new sieve with a new one.

Thus are readily seen the advantages.
Following is the price list of the Stewart
Patent Detachable-Bottom Sieve:

Mesh No....... 14 16 18 20 24 30 Annealed Wire...\$3.00 3.00 3.25 3.50 4.00 5.50 Plated Wire..... 3.75 4.00 4.25 4.50 5.00 7.50 Discount, 33½; time, 60 days; 2 per cent, cash to days.

Extra Meshes or Bottoms, Per Doz.

Manufactured exclusively by Smrth Bros., Fort Madison, Iowa.

Graham & Haines, No. 113 Chambers street, have issued, under date of 1st instant, their No. 2 discount sheet and re-

by an appendix of new goods added to their assortment since the above-named catalogue was issued. Among the new goods are several patterns of Mortise and Rim Locks, Knobs, Escutcheons and kindred goods manufactured by the Jacobus & Nimick Mfg. Co., and illustrations and lists of the following specialties are shown: Patent Brighton Coffee Mills, Ives' Patent Door Bolt, Star Salt Caster Co.'s Patent Door Knobs, Patent Anti-Window Rattler, Domestic Parallel Vise, Scandinavian Security Pad Locks, Tucker's Adjustible Stove Truck, Phœnix Caster Co.'s Casters, Tucker & Dorsey's Alarm Money Drawers, Tobacco Cutters, Well Wheel Pulleys, Harness Buckles, Improved Geneva Hand Fluters and Geneva Hot Air Crimper, Ohio Lawn Mowers, Blood's Corn Hooks, Hedge Knives and Bush and Bil-Hooks, Detroit Block Work's Pulley Blocks Disston's Round Steel Blade Screw Drivers. Tack Hammers, &c.

We have received the following:

BUFFALO, N. Y., May 14, 1879. We would again remind the trade to be ware of counterfeits of the Clark Blind Hinge. Remember the genuine has the V-shaped Pin and Eye; also our new patent locking device, and the name "Clark's" cast on each hinge. No other manufacturer can furnish Clark's Blind Hinge, and all imitations are counterfeits. CLARK & Co.

The manufacturers of Cordage have issued

the following revised price list for Manila and Sisal Rope, under date of the 20th inst., showing an advance of one-quarter cent per pound over previous quotations. The list is subject to the usual trade discount. The price of Oakum remains as before.

Prices of Cordage, May 20, 1879. and 9 th'd
and 14½
Manila Whale Lines. 13½
Tar'd Manila. 11½
Fine Tar'd Manila Lath Yarn. 13
Sisal Rope, sizes above 12 th'd and Hay
and Hide Rope. 10
Sisal Rope, 12 th'd (¾ in, diam.). 10½
12 th'd and 9 th'd ¼ in, and
5-16 in diam). 11
Tar'd Sisal Lath Yarn. 9½
We leave that Cl A Rlack and R.

We learn that C. A. Black and R. B. Owen, of Detroit, Mich., have formed a copartnership, under the style of Black & Owen, and are now making arrangements with manufacturers. They intend carrying a full stock of Shelf Hardware, Tinware, Tinners' Stock, &c., suited to the requirements of the wholesale jobbing trade. They expect to be in running order by July 1.

Fernald & Sise, No. 100 Chambers street, have been appointed agents for the Penn, Hardware Company, of Reading, Pa., and have in their warerooms a full line of their samples.

Hermann Boker & Co., have advanced the price of their Nickel-Plated Shears 21/2 per cent. owing to the recent Court decision, by which the makers of Nickel-Plated goods are obliged to take out a license from the U. S. Nickel-Plating Company.

IRON.

American Pig.-The market is steady, with a fair seasonable demand, and a noticeable feature of it is that all the Iron changing hands is going into consumption. It is usual at this time of year to have a lull in the Iron trade, and the present season is not an exception to the rule; still in the matter of price makers are strong in their views and no anxiety whatever is manifested by them as regards the balance of the year, all seeming to concur in the belief that the Iron trade of the country is now traveling on the upward plane. We hear of some inquiry for large parcels, but no transactions of magnitude are reported. We quote at unchanged figures as follows : Foundry No. 1, \$18 @

larger scale than isual, and amount to 1000 tons, 500 of which came by sailing vessel, and will likely go into yard; the remaining soo tons by steamer, and consisting of Eglinton, Coltness and Glengarnock, was partly sold to arrive. We quote: Eglinton, \$19.50 @ \$20, and Coltness, \$22.

Rails.-The business of the week has been light so far as this market is concerned. although we hear of some good-sized transactions pending and likely to be closed at any moment. There is a rumor of a sale of 3000 tons Steel Rails by a Western mill, and beyond this nothing of any magnitude is reported either in Steel or Iron. We continue to quote Steel at tide-water \$45, and Iron at mill, \$35 @ \$36.

Old Rails .- Some small lots have changed hands within a few days. We quote: \$20 @ \$21. here.

Scrap.-No sales of Scrap Iron are reorted since our last writing. We quote No. Wrought, from yard, \$23 @ \$24.

METALS.

Copper.-The large shipments of Copper during the past two months gave sufficient indication of some new contracts made for that purpose; these were, nevertheless, kept strictly secret. It now appears, however, that there have thus been sold for export some 5000 tons Lake Superior during the past three months at various prices, averaging about 14¢. Of these about 2000 tons have been delivered, while the remainvision of list prices to apply to their 1878 ing 3000 tons are to be taken during the enillustrated catalogue, which is supplemented suing three to four months. After this ex-

possible scarcity of Copper for short de-livery; they were consequently induced to secure between 3,000,000 and 4,000,000 pounds of Lake Superior Copper, to be delivered during the next three months, at 16¢, aside from 600,000 to 800,000 pounds Baltimore, simultaneously placed at 151/2 for deliveries during the summer. The facts of the case, in our opinion, do not in the least warrant any such apprehension of coming scarcity, for it is evident that in reality the stock of Copper at the commencement of the year has been a good dea larger than was estimated at the time, for if this had not been the case, we should have been unable to spare over 6,000,000 pounds for export since, and yet leave a stock of some 3,000,000 pounds. During the winter hardly any Copper has been received on this coast overland by rail, and as there has been no abatement in production in the meantime, it seems to us clear that the next few months we shall have receipts from there considerably in excess of former years. there considerably in excess of former years. Sales for the week aggregate some 200,000 pounds Lake Superior, in lots, at 16¢ @ 16½¢. Mail accounts have reached us from London to the 10th May; prospects at the encouraging, nor time were by no means time were by no means encouraging, nor has the situation improved since, for we receive from London the cable quotation of £56 for Chili Bars, and £62 for best selected. The demand for Manufactured Copper is The demand for Manuscours moderate, but the combination prices are moderate, but the maintained. We quote: New Sheathing Copper, 22¢; Braziers', 24¢, and Bolts, 24¢. Bottoms, 26¢; American Yellow Sheathing Metal, 13½¢; Yellow Metal Bolts, 20¢, and English Yellow Sheathing Metal, 12¢@ 12¼¢, currency, in bond.

Tin.—Our market continues to rule weak and lifeless, as was generally expected under existing circumstances. We quote large lines Straits, on the spot, 144¢; English Refined, 14½¢; ditto Common, nominally, 14¼¢; Billiton, nominally 13½¢, and Banca, 174 \$\psi\$ infinitely 1972, and Dearway, 177 \$\preceq\$ 17\psi\$ \$\psi\$. Arrivals during the past week have been larger than ever known before in the history of our trade, there having been received 20,227 slabs Straits and 7300 with some imslabs Billiton, and, coupled with some importations of Australian and English, the receipts swell to a grand total of about 1500 We estimate American annual consumption at between 5000 and 6000 tons; the importation of a single week has there fore been simply enormous, and the hazard-ous nature of present Tin dealings becomes all the more glaring when we take into con-sideration the proximity of the dull sum-mer season. The cable informs us that mer season. The cable informs us that thus far in May there have been shipped from Singapore 300 tons to England and 80 tons to the United States to England The foreign markets continue to rule dull and with a downward tendency, London cabling Straits £66, and Singapore \$20.25 per picul. In view of the liberal shipments from the Straits and Australia, these figures from the Straits and Australia, these figures are still high ones when we remember that Straits declined to £53 last year in London and to 13½¢ at New York. Next week further full arrivals of Tin are expected at New York. The statistics of Messrs. Gilfillan, Wood & Co., Singapore, April 12, show that there were shipped from the Straits settlements to the United States during the first quarter of 1870, 21,088 picules. ing the first quarter of 1879, 31,988 piculs, against 18,727 during the corresponding period of 1878. Tin Plates.—The market is very quiet, and there are no English advices of importance by cable. The makers' combination expires on June 1 next, and we are without advices as to its renewal. They write from Liverpool under date of May 8: "At date inquiry is confined principally to Charcoal Ternes, which, with best Charcoal Tins, are firm. All other descriptions are cheaper, and even at reductions noted are finding few buyers. Makers have not yet agreed on any united action to limit pro-duction." We quote at the close: Charcoal Bright, \$6 @ \$6.25; ditto Ternes, \$5.50 @ \$5.75; Coke Tin, \$5.25; and ditto Ternes, \$5 @ \$5.12½ per box, large lots, ordinary

Lead .- The market is languid, and there figures as follows: Foundry No. 1, \$13 @ is no demand. The asking price for Comsing; Foundry No. 2, \$17 @ \$18; Gray Forge, \$16.50.

Scotch Plg.—The arrivals of Scotch Iron at this port during the week have been on a larger scale than usual, and amount to 1001. are still officially quoted at last week's fig ures, they are evidently not low enough induce shippers to purchase yet awhile, and consequently the exports are comparatively very small." Spanish Lead is quoted at London, per cable, to-day £13, less 3½ %. One of the English mining papers contains, under on, per cause, to day £13, less 3½ %. One of the English mining papers contains, under date May 10, the prospectus of a Missouri Lead mine, whose shares are now being offered in the European market. The document states that the company will be able to market its Lead at £10 per ton of 2240 pounds at St. Louis, and in a separate article we find the following resease. "It will cle we find the following passage: "It will be seen that upon the production of only be seen that upon the production of only 400 tons of Lead per month an annual profit of £28,800, or exactly 32 % per annum, upon the entire nominal capital of the company (£90,000) will be realized." This, it will be seen, implies the prospect of a profit of £6 per ton, if the Lead be all sold at St. Louis at £16. The latter would be equivalent to a price of about £16 per ton, at \$1.000. price of about 3½¢ per pound, at St. Louis, which seems to us altogether too sanguine a calculation in view of the large production in the United States, estimated by some people at 100,000 tons for the present year, out of which this country may take at the utmost some 80,000, leaving for export 20,000 tons. As matters stand at present, it is more likely that the Lead will average a selling price of 23/¢ at St. Louis, which would be equal to £12. 16/ per ton, leaving a profit of about £13,440, or 15% on the nominal capital, which we should consider a good nvestment, of manufactures, we quote: Bar, $4\frac{1}{2}$ ¢; Pipe, $4\frac{1}{2}$ ¢; Sheet, $5\frac{1}{2}$ ¢; Tinlined Pipe, 12¢; No. 1 Solder, 10¢, all less 10 \$\$ to the trade.

Spelter and Zinc.—The market for Domestic Spelter remains inactive at 4½¢.
We quote Refined 8¢ @ 8¾¢; Silesian, 5½¢
@ 5¾¢; and Bergenport, from Lehigh Ore,

port movement became known, several of 9¢; Sheet Zinc, 6¼¢ @ 6½¢. At London, our manufacturers got alarmed, fearing a May 10, Silesian Spelter was offering at Nickel-Is unaltered at \$1.25 for Amer-

Antimony .- A moderate demand prevails at 113/8¢ @ 12¢, according to brand.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the

Danish West Indies.	Bri
Quan. V'lue. Petlm., gals 585 \$82	01
Hdw., cs 7 90	Glass Wire
Nails, kegs 25 56 Iron safes 2 78	Moto
Iron safes 2 78 Pltd. ware, cs. 6 75 Slates, cs 6 52	
Date 60, 65	Ag. i

Rostock. Ptlm., gals. 194,664 16,578 Stockholm. Petlm., gals. 56,944 5,191 Elsinore. Petlm.,gals.298,182 28,674

Copenhagen. Petlm.,gals.247,013 20,663 Pltd. ware, cs. 4 261 Pltd. ware, cs. 4 261 Slates, cs..... 60 218 Cronstadt.

Petlm.,gals.363,613 36,658 Sew.mach.,cs. 420 7,600 Hamburg. Ag. imp., pkgs 42 Mach'y, cs... 19 Mf. iron, pkgs, 882 Hdw., cs.... 97 Idw., cs. ... 97 lew. mach., cs. 755 Sew. mach., cs. 755 x5,180 (Cge mtis., pgs 255 210 Mach. oil, gals 180 5 petlm., gals. 237,666 20,425 Ptld. ware, cs. 150 Tinware, cs. 25 755 Gas fixt., cs. 8 80 Copper, cks. 45 8,495 Belting, cs. 4 7,145 S. rollers, cs. 30 180 Slates, cs. 30 180

Amsterdam. Petlm.,gals.278,404 24,070 Dutch East Indies. Petlm.,gals.723,300 88,69

Liverpool. Bromen.

tm.,gls.1,189.972 111,04 Steel, bxs.... 3
Belting, cs... 3
Ptg. pr'ses, cs 8 Rotterdam.

Copper cks... 13 3,431 Br'ss goods, cs 12 1,000 Cub. oil, gals... 252 75 Hdw., cs..... 6 730 Ag. imp., pkgs 59 3,081 Mach'y, cs... 2 289 Fumps, pkgs. 33 1,500 Antwerp.

Ag. imp., pkgs 7
Br'ss goods, cs 2
Sew. mach., cs 20
Cartridges, cs. 1
Hdw., c3..... 3 Hdw., c3..... 3 45 Lub. oil, bbls, 630 7,040 Nails, cs.... 16 186 Copper, cks... 54 10,125 Guns, case... 1 222 London.

sware, cs. 51 Hdw., cs..... 81 Ag. imp., pkgs 9 Mf. ircn, pkgs 12 Bristol. Mach'y, cs... 10 C'ge mtl., pgs. 31 Hull.

Slates, cs..... 12 60 Pltd. ware, cs. r 98 Ag. imp., pkgs 366 13,987 Mf. iron, pkgs. 19 500 Mach'y, cs.... 20 1,200 Glasgow. Boil. comp.,ck 8 Hdw., cs..... 4

Lisbon. Petlm., gals. 82,397 7,100 Danzig. Petlm., gals, 165,000 14,02 British Possessions

in Africa. Carriages.... 3 Hdw., cs..... Ag. in: p., pkgs British North Amer-

Glassware, cs. 113 343 Petlm., gls....9315 1,283 Coal, tons.... 858 2,838 Gibraltar. Petlm., gals.51,000 Petlm., gals.34,734 Tinware, cs...4 1,306

l'inware, cs. British Guiana.

Petlm., gals...5000 625 British Australia.

Hdw., pkgs... 1,89 18,059
Mach y, pkgs... 688 26,009
Scales, pkgs... 1015 15,003
Pumps, pkgs... 9 458
Belting, cs... 2 295
Carriages... 93 7,720
Sew. mach... Cs. 46 2,550 Sew. mach., cs. 4 7 45,500
Belting, bxs. 2 500
Cars. 8 72,315
Ag.imp., pkgs 133 3,901
Petlm., gals.38,800 5,377
Mf. iron, pkgs 175 1,553
Pltd. ware, pgs 22 1,643
Silverware, cs. 6 11,932

tish West Indies. Quan. Value. ssw're, pgs 87 2,415 e, pkgs... 35 450 ors.... 4 15,000

Havre. imp., pkgs 101 7,959 Dunkirk.

Petlm.,gals.156,410 11,500 French West Indies Carriage.... 1 200 Petlm., gals. 10,000 1,175 Cuba.

Mach'y, pkgs. 53 2,278
Nails, cks.... 14 130
S. w. appr.,pgs 14 132
Sew. mach., cs 10 144
Tinware, cs... 3 45
Iron safe.... 1 88
Coal tons Coal, tons....
Mf. iron, pkgs.
Hdw., cs....
Saddlery, cs...
Iron, pkgs... Glassware, cs. 25 Mach. oil, gals 550 Petim., gals...5776 Nails, kegs... Grindstones... 110 Ag. imp., pkgs 12

Mexico. Petlm., gals.12,518 Cutlery, cs... 61
Mf. iron, pkgs 74
Carbines, cs... 4
Nails, bxs... 27
Tin, bxs... 10
Ag. imp., pkgs 33
Cartridges, cs. 65 Ag. mlp., pags 33
Cartridges, cs. 42
Linc, pkgs. 4
Shot, bxs. 2
Rifles. cs. 12
Tel. mtls., pkg 1
Sew. mach., cs. 450
Mach'y, cs. 40
Lron, pkgs. 4
Pistols, cs. 2
Glassware, cs. 70
Hdw., cs. 153
Lead, pkgs. 3
Lead, pkgs. 1
Quicksil, fixs acc
Caps, cs. 4
Nalls, kegs. 2
Grindstones 2

Trieste. Coal, tons... 60 24e Petlm.,gals.xo5,943 9,203

United States of Co-Sew. mach., cs 30 L. oil, gals... 287 Pistols, case... r Pistols, case... x Iron, pkgs... 95 Iron safe... x Petlm., gals... 3867 Tubes... 100 Glassware, cs. 100 Glassware, cs. 100 Ag. imp., pkgs... 67 Hardware, cs. 20 Ag. imp., pkgs... 68 Revolvers, cs. 3 Powder, lbs... 4512 Cars... 7

Central America. Sew. mach., cs r Glassware, cs. 22 Revolvers, cs. r Petlm., gals... 450 Powder, lbs... 200

Africa. Petlm., gals. 10,000 1,075 Hayti.

Mf. iron, pkgs 10
Mach. oil, gals 18
Hdw., cs. 18
Wagon ... 1
Nalls, kegs. 200
Petim., gals., 7050
Copper, sack. 1
Iron, pkgs. 6
Nails, cs. 20 Brasil. Petim., gals.34,000 3,920 Leghorn.

Rifles, cs 3 Cartridges, cs. 6 Discourse Petlm., gals. 110,000 12,500 Canary Islands. Petlm., gals.. 1003 145 Oporto.

Sew. mach, cs. 1
Alexandria. Ptim., gals.293,490 32,284 Corfu. Ptlm., gals. 152,000 18,000

Venezuela. Petim., gals. 12,560 1,562 Hdw., pkgs... 83 853 Shoe nails, cs. 6 170 Nails, kegs... 22 6s Mach'y, pkgs. 48 567 Sew.mach., cs. 33 531 Coal, tons... 54 101 Argentine Republic. Tinware, pkgs 2 26 Sew.mach., cs 9 400 Ag. imp., pkgs 32 265 Hdw., pkgs... 7 137 Petlm., gals.85,000 9,778

Mf. iron, pkgs 457 2,508 Coal, tons... 200 559 Extinguishers 3 338 Petlm., gals.70,840 7,881 Hdw., pkgs... 37 446 Nails, kegs... 250 593 Sandwich Islands. Petlm., gals... 100 12 Coal, tons.... 510 1.530 Porto Rico.

China.

Glassw'e, pkgs 35 Iron safe..... z Ag. imp., pkgs 17 Nails, kegs.... 64 Name, segs... 04.
Type writer.. 1
Sew.mach..cs r
Inst'm'ts, bxs. a
Hdw., pkgs... 40
Mf. iron, pkgs 5
Mach'y, case. 1
Petlm., gals...3930

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending

May 20, 1879:	
Hardware.	Tools, chest, r Per. caps., cs., 8
American Meter Co.	
Mdse., pkgs, 1	Iron.
American Meter Co., Mdse., pkgs., r Ansonia Clock Co., Mdse., pkgs., 5 Arnson & Witzinski, Mdse., pkgs., 18 Baldwin Bros. & Co. Gun barrel fittings,	Chaplin E. C. Cases, 207 Drexel, Morgan & Co. Tons, 856 Francklyn Chas. G. Sheet iron, bdls., 366 Hoop iron, bdls., 366 Hoop iron, bdls., 366 Hoop iron, bdls., 366 Wire gauge, coils, 25 Mari Carlos, Iron rods, bxs., 12 Cast-iron wheel, x Marvel Wm. D. Ore, tons, 830 McCoy & Co. Hoop iron, bdls., 420 Milliken & Smith, Wire rods, bdls., 400 Williamson James & Co. Pig, tons, 100
Arnson & Wilzinski,	Drexel, Morgan & Co.
Mdse., pkgs., 18	Tons, 856
Gun harrel fittings.	Sheet iron, bdls., 360
CS., 5	Hoop iron, bdls. 126
Mdsc., pkgs., 40 Blumenthal A. & S. Mdsc., cs., 37 Boker Hermann & Co. Hdw., cutlery, guns and per. caps, pgs.	Pig. tons. soo
Mdse., Cs., 37	Lundberg Gustaf,
Boker Hermann & Co.	Nail rods, bdls., 996
and per, cape, pirm	Marti Carlos,
150	Iron rods, bxs., 12
sand per. caps, pgs. Solims & Co., Hdw., csics., 5 Eichhorn A., Hdw., csics., 5 Eichern A., Hdw., csics., 5 Erie Railway Co., Mdse., pkgs., 7 Folsom H. & D. Arms, cs., x Francklyn, Chas. G. Bolts and nuts, cs. cs.	Marvel Wm. D.
Eichhorn A.,	Ore, tons, 890
Hdw., caks., z	McCoy & Co.
Mdse., pkgs., r	Milliken & Smith,
Folsom H. & D.	Wire rods, bdls., 498
Arms, cs., I	Pig, tons, 100
Bolts and nuts, cs. 20	Order,
Prancklyn, Chas. G. Bolts and nuts, cs. 29 Friedman & Lauterjung,	Pig, tons, 100 Order, Bars, 455 Bundles, so Iron sleepers, 10 Ore, tons, 500 Pig, tons, 700 Scrap, tons, 101 Sheet iron, bdls., 361
Fuller Bros.	Iron sleepers, 10
Mdse., cs., r	Ore, tons, 500
Graef, Nevins & Co.,	Scrap, tons, 700
Friedman & Lauterjung, Mdse., pkgs., 3 Fuller Bros., Mdse., cs., 1 Graef, Nevins & Co., Mdse., pkgs., 3 Hayden Peter, Mdse., pkgs., 3 Hecht Bros. Mdse., pkgs., 4	Scrap, tons, 181 Sheet iron, bdls., 361 Spiegel, kilos, 203,000
Mdse., pkgs., 3	Spiegel, Kilos, 203,000
Mdse pkgs. 4	Steel.
Hermann H. & Co.	Brown W. Bundles, 133
Mdse., pkgs., 25	Cases, 133
Mdse., pkgs., 108	Cases, 13 Gautier Steel Co.
Howard, Sanger & Co.,	Mdse., pkgs., 3
Tawis Bros. & Co.	Mdse., pkgs., 3 Wessell Aug. Bundles, 134
Hecht Bros. Mdse., pkgs., 4 Hermann H. & Co. Mdse., pkgs., 28 Hopkins E. T. Mdse., pkgs., 108 Howard, Sanger & Co., Mdse., pkgs., 6 Lewis Bros. & Co. Mdse., pkgs., 1 Love & Roberts, Firearms, cs., 2	Cases, 6 Wolff R. H. & Co., Steel wire, pkgs. 2212 Woodford W. O.
Love & Roberts,	Steel wire, pkgs. 1112
Mason John H.	Woodford W. O.
Wire rope colls, 8	Bars, 37 Bundles, 246
Hdw., cs., 2	Cases, 7
Mdse., pkgs., 13	Order, Bars, 20 Bundles, 85
Arms, cs., 5	Bundles, 85
Gun caps, cs., 2	Cases, 9 Old spring steel,
Prosser Thos. & Son,	tons, 75
Rogers H.,	tons, 75 Scrap, tons, 100
Lewis Bros. & Co. Mdse., pkgs., r Love & Roberts, Firearms, Cs., 2 Mason John H. Wire rope colls, 8 McCoy & Co., Hdw., Cs., 2 Mdse., pkgs., r More's J. P. Sons, Arms, Cs., 5 Gun caps. cs., 2 Proser Thos. & Son, Mdse., pkgs., 4 Rogers H., Mdse., pkgs., x Schoverling, Daly, & Gales, Mdse., pkgs., 4	Metals.
Gales,	Aleo Miguel,
	Tins, cs., 8
Type, kegs, 7	Baring Bros. & Co.
Somon, Goest & Co., Type, kegs. 7 Struller, Lau & Co., Per. caps, cs., 4 Von Cleff & Co., Mdse., pkgs., 6 Ward Asline, Mdse., pkg., 1 Wetzlar M. Mdse., pkgs., 3	Tins, cs., 8 Tinfoil, cs., 3 Baring Bros. & Co. Tin, slabs, 7395 Brown Bros. & Co. Tin, ingot, r Bruce & Cook,
Per. caps, cs., 4	Tin, ingot, s
Mdse., pkgs., 6	Bruce & Cook,
Ward Asline,	Tin plates, DXS., 390
Wetzlar M.	Douglass Jas. & Co.
Mdse., pkgs , 3 Wiebusch & Hilger	Old metals, pkgs., 3
Hdw. Co	Tin plates, bxs., 317
Hdw. Co., Hdw. and cutlery,	Francklyn, Chas. G.
pkgs., 27 Winchester Arms Co.,	Honkins & Bevan.
Mdse., pkg., 1 Wolff J.	Tin plates, bxs., 200
Wolff J.	Mayer Bros. & Co.
Type, cs., 5 Wolff H. & Co.,	Meyer M.
Mdse., pkg., 1 Woodford W. O.	Load, bars, 5564
Woodford W. O. Grindstones, 42	Tin plates, bxs., 2013
Order.	Tin, ingot, 1 Bruce & Cook, Tin plates, bxs., 3so Tinned sheets, cs., 15 Douglass Jas. & Co. Old metals, pkgs., 3 Drexel, Morgan & Co., Tin plates, bxs., 31 Francklyn, Chas. G. Tin plates, bxs., 107 Hopkins & Bevan, Tin plates, bxs., 200 Mayer Bros. & Co. Tin slabs, 1000 Mayer M. Lead, bars, 5564 Naylor & Co. Tin plates, bxs., 2913 Phelps Dodge & Co. Tin plates, bxs., 2913 Phelps Dodge & Co. Tin plates, bxs., 10,731 Thankey & Co.
Antimony, caks., 50 Cannel coal, a quan-	Tin plates, bxs.,
tity.	
tity. Files cks., 19	Old metal, pkgs., 3
Guns, cs., 7	Order,

Order, Tin, ingots, 634 Tin, slabs, 12,936 Tin and terne plate bxs., 6579 Guns, cs., 7 Gun barrels, cs., 4 Hdw., bdls., 480 Regulus of anti-mony, csks., 34 COAL

The Coal trade during the past week has been marked by no especial feature either in prices or movement. Most dealers here have as many orders upon their books as they care to fill for the present month and at the present prices, and are not generally offering Coal. They are, as a rule, we think, declining to duplicate orders already taken. The active demand of the previous week has not apparently been maintained, and, if the order books were not already well filled, it would be regarded not already well filled, it would be regarded as a rather dull trade. While printed quotations are the same as last week, dealers are re-porting that the actual prices are somewhat nearer the quotation than heretofore. It is said that store Coal is as much as 10 cents nearer the quotations than last week. This may, however, be taken as the asking price, rather than the actual figure at which sales are made. Those who are out of the market, either from lack of Coal or from surplus of orders, are apparently making an advance in their asking prices, which is probably more apparent than real. The manufacturers and consumers generally ap-pear to be putting in all the Coal that they can find room for, or, where room is unlimited, all that they can pay for. They do not, however, seem inclined to buy when an advance is suggested, although willing to order freely at the present figures. Freights have not advanced since our last. We quote \$1.40 (2) \$1.45 to Boston, and with the usual advance for the ports further East. Providence is still quoted at \$1. To New Haven, in large cargoes, we hear of 60¢ being paid, though the rate in small vessels we think is higher. The scarcity of vessels still continues, and it will probably be a considerable time before any change can take place in this respect. The Coal tonnage for the year does not, according to Mr. Saward's tables, grow perceptibly over that of last year. The accidents at mines and the want of miners are two of the most apparent causes. The operators in some of the regions complain of the great scarcity of men, which they say is caused by an exodus that has been going on from the regions for some time, and which threatens to become a serious factor in the Coal preduction problem. Coal production problem.

The printed prices issued this week are the same as those given last week. Auction prices :

Grate 2.05 Egg 2.09½	Chestnut 2.2812
	neral are about as fol-
Lump\$3.30 Broken2.75 Egg	Stove

The Delaware and Hudson quote \$2.20 for The Delaware and Hudson quote \$2.20 for Lump, Steamer and Grate; Egg, \$2.25; Stove, \$2.55, and Chestnut, \$2.50. The Pennsylvania Coal Company's new circular quotes for Coal at Newburgh: \$2.15 for Lump, Steamer and Grate, \$2.20 for Egg and \$2.35 for Stove and Chestnut. There is the usual amount of urgent inquiries, but the mills are so full few months ago. A mooted question is quotes for Coal at Newburgh: \$2.15 for Lump, Steamer and Grate, \$2.20 for Egg anything additional, unless for delivery and \$2.35 for Stove and Chestnut. There is the usual amount of urgent inquiries, but the mills are so full few months ago. A mooted question is forge, \$17 @ \$22. Muck Bar.—\$27 @ \$34; Old Rails, \$18 as Charcoal—Car Wheel Metal, \$22.50 @ \$27.50; do., Extra Standard, \$24 @ \$29.50; while no higher, are firmer than they were a few months ago. A mooted question is whether the heaters and rollers, in case of a suspension of the puddling furnaces, will in the distant future. Some few orders

50 cents per ton additional for delivery in New York on this coal.

OLD METALS, PAPER STOCK, &c. In the Old Metal market this week we note a free demand for Copper and Brass Composition at the old rates. Zinc has a downward tendency, and will probably continue to decline. The Rag and Paper Stock market is dull in all its branches.

	The purchasing prices for Old Metals are as fo	offer ollows	ed by	de	ale
1	Copper, heavy	per D.		0	
ı	Copper Bottoms	44	.093/2	0	
1	Yellow Metal	#8 TD	.081/2	0	
١	Brass, heavy	- 66	.081/2	0	**
ı	Brass, light	46	.0778		
	Composition, heavy	66	.11%		
1	Lead, solid	66	.02%	a	*.0
1	Tea Lead	44		0	
J	Zinc	- 64	.02%	0	
1	Pewter, No. 1	46	.10	0	
- 1		54		100	

J	Wrought Iron prtom. \$16.00 @		17.0	C
1	Light do " 7.50 @			*
ı	Stove Plate " 9.50 @			
1	Machinery do., " 11.50 @			
1	Grate Bars " 3.40 @	k		٠
	The prices current for Rags, &c., a follows	T		8
1		-	9/-	ľ
1	Canvas, Linen per D. 3 C.	р.	3750	
1	White Cotton, New 436c.			
٢	NO. 2 1780. U			
1	White, No. 1 34c. 6	3	4 C	u

	ALLIVER, LAMEDIA	PLOW WAY	. 3 3	
	White Cotton, New	44	436c. @	
-	" No. 2	44	11/4 C. @	
	White, No. 1	44	3%C. @4	C.
2	4 No. 2	46	11/2 C. @	
0	Seconds		136c. @	
0	Mixed, Woolen	80	2 C. @ 3	C.
	Soft, do		836c. @	e.
	Mixed Rags	64	2 0. 6 3	C.
	Gunny pagging	16	3 C, @	
	Jute butts	66		
	Kentucky bagging	8.6	2%C. 03	
	Book Stock	64	13/c. @	
	Newspapers	8.6	1 4c. @ 1	
	Waste Paper and Scraps	44	3/c. @	
	Kentucky Bale Rope	6.6	4 C. @	
	Tarred Shaking	66	I C. @ I	
	Grass Rope			Zc.
3	Grass Nope			

Messrs. Du Plaine & Co., Philadelphia,

-	under date of May 20, quote the prices for Old Metals as follows:	
	Cente	19 1
	Heavy Old Copper 141/2	@
	Light Tinned Copper 12	@
	Copper Bottoms	Ø
	Locomotive Copper and Tin Bronze13	a
,	Heavy Red Brass Scrap	
	Tight Ded Press Scrap	a
	Light Red Brass Scrap	a
	Heavy Yellow Brass Scrap 9	
	Light Yellow Brass Scrap 7	@
	Old Lead Pipe	@
	Old Junk Lead (melted in mass) 21/2	
	Tea Lead 2%	@
	New Zinc Clippings 3½	Ø
	Old Scrap Zinc 3	60
	Old Battery Zinc 21/2	@
	Plumbers' Lead Joints 3½	@
	No. 1 Pewter	@
	No. 2 Pewter 8	@
	Old Type Metal 4	@
5	Red Brass Turnings 7	@ 12
	Yellow Brass Turnings	@ 6
	Spelter Dross	@ 2
		@ 2
	Stereotype or Electrotype Plates 4	@

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St. PHILADELPHIA, May 20, 1879.

Pig Iron.—The market is quiet, but firm and the tendency is still toward higher prices. Sales have not been particularly heavy, as no one seems willing to accept orders for future delivery unless at higher prices, so that business is of a "hand-to-mouth" character. The consumption of Iron seems to be increasing, and the future of the trade is of a hopeful character. We advance our quotations somewhat, say, No. 1 Foundry, \$18.50 @ \$20; No. 2 do., \$17.50 @ \$18; Gray Forge, \$16.50 @ \$17. Sales of No. 1 Foundry, in round lots, reported at \$19.50 for summer delivery

Muck Bar.-The market is quiet, but firm, with prospects of higher prices at an early date. Sales, Philadelphia delivery, \$32, with \$31.50 @ \$32.50 as extreme figures.

Blooms.-The market is quiet at un-Blooms.—The market is quiet at unchanged prices, as follows: Sunken Scrap Blooms (2,164 b), \$38 @ \$39; Northern Ore Blooms (2240 b), \$33 @ \$37; best quality Charcoal Billets (2240 b), for wire and steel purposes, \$58 @ \$60; Bars do., \$62.50 @ \$65; Sheet Iron Blooms, cornered (2464 b), \$53 @ \$55; Cold-blast Charcoal Plate Blooms, \$50 @ \$53; run-out Anthracite. \$43 @ \$47.50. cite, \$45 @ \$47.50.

Structural Iron.—The market is very active, and some large contracts have just been closed including one of 1000 tons Beams, Angles, &c., for the Eric Railway Co.; another of 600 tons of a similar character, besides numerous small lots. Prices are very firm, but as yet unchanged, although the tendency is toward an advance. We quote: Angles, 2.1¢ @ 2.3¢: Tees, 2.3¢ @ 2.4¢; Beams and Channels, 2.5¢ @ 2.7¢, according to specification.

Plate and Tank Iron.—The market is have been entered since last report. Prices are said to be somewhat firmer, but the mar-ket is irregular and nominally as before quoted. Skelp is in demand; orders amountquoted. Skelp is in demand; orders amounting to over 1000 tons are in the market, and will probably be closed in a day or two. We quote: Skelp, 1.9¢ @ 2¢; Common Plates, 2.2¢ @ 2.3¢; Tank Iron, 2.2¢ @ 2.4¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.75¢ @ 2.9¢; Flange Iron, 3.7¢ @ 4¢; Solid Firebox, 4.85¢ @ 5¢, and Best Bloom, 5.5¢ @ 6¢.

Sheet Iron.-The market is quiet, but with more disposition to buy than during the past month or two. Prices are steady, and the past month or two. Prices are steady, and for small lots may be quoted as follows: Common Sheet, No. 20 to 23, 3.2¢ @ 3.3¢; No. 24 to 28, 3.4¢ @ 3.5¢; Best Refined Sheet, No. 25 to 28, 3.6¢ @ 3.7¢; No. 16 to 24, 3.4¢ @ 3.5¢; Best Bloom Sheets, No. 16 to 24, 5.5¢ @ 5.7¢; No. 25 to 28, 5.8¢ @ 6¢; Refined Plates or Blue Annealed, 5-16 to 16, 2.6¢ @ 2.7¢; Best Bloom, 5-16 to 16, 5.3¢ @ 5.5¢; A Patent Planished, 10½¢; B Patent Planished, 45 & discount; second quality, 55 %; extra discounts for large lots. extra discounts for large lots.

Bar Iron.—The market is very firm, and a larger volume of business has been done during the past week than for some time past. Sales in large lots have been made during the week at an advance of nearly \$2 per ton, one order for 1000 tons at full prices having been taken a day or two ago.
We quote 1.8¢ for Common to 2¢ for Best

for small lots have been taken at \$42 @ \$43 at mill, which may be considered an aver-age rate either for immediate or future deage rate either for immediate or future de-livery. Sales appear to be purely a matter of accommodation, buyers are willing to pay the price, and manufacturers show no dis-position to take advantage of buyers' neces-sities, and decline orders only because it is impossible to fill them. We quote the mar-ket steady at \$42 @ \$44 at mills.

ket steady at \$42 @ \$44 at mills.

Iron Rails—Continue in active demand, with sales of large lots at full quotations. Several orders have been placed during the week, including one of 7000 tons for the Gulf, Colardo and Santa Fe Railway. Numerous inquiries are reported from the South and Southwest, and sales, to a large extent, have been for delivery in this direction. The mills are very full of work, and there is every reason to think and there is every reason to think that the demand will continue for some time, that the demand will continue for some time, as there are more bona fide buyers in the market than we have ever seen before. Some are well prepared with cash, although a large number are endeavoring to buy on long time, with bonds as collateral. The abundance of money and general renewal of confidence in railway securities, however, will doubtless enable many to raise funds through other sources, and thus after a while be in a position to enter the market as cash buyers. We quote \$35.50 @ \$37. as cash buyers. We quote \$35.50 @ \$37, according to location of mill, section of rail, &c. Sales of 3000 tons 56s reported at \$37.50 at tide.

Spikes.—The demand is urgent at former prices, viz.: 5½ x 9-16, 2¼¢; ¼ x 4 and longer, 2½¢; 7-16 x 4 and longer, 2.6¢; ¾ x 3½ and longer, 3¢.

Old Rails.—The scarcity still continues,

and sales of small lots for immediate deliv-ery have been made at advanced rates. At the moment the dearth of Old Rails on the spot is as great as ever, with no immediate prospect of relief. The demand seems to be from all quarters, and sales in most cases appear to have been made before the Rails appear to have been made before the Rails were taken up, so that comparatively few have been shipped to the leading markets, as was formerly the case, "for sale to arrive," at current rates. We regard this as conclusive evidence of the great improvement in the Iron trade. Iron of all descriptions has had to search for buyers until recently, but now buyers generally appear to be in search of Iron. We quote \$22 @ 22.50 as the nominal market rate. the nominal market rate.

Old Car Wheels.-Sales of small lots have been made at about \$18, Philadelphia delivery—\$19 at an outside point—and large lots offered at \$18.50, Philadelphia de-livery. Buyers appear unwilling to pay over \$18.

Scrap Iron.-The demand is active, and sales are easily made at somewhat higher figures, say \$23.50 @ \$24.50 for Wrought and \$14 @ \$15.50 for Cast.

Nails—Are quiet, but prices are firm at \$2.25 for wholesale lots.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., May 20, 1879.

Pittsburgh is realizing more and more the advantage of railroad competition, as she has cheaper rail freights now than ever be-fore, and her manufacturers, in this import-ant respect, have no reason to complain. The Pittsburgh and Lake Railroad has reduced rates on heavy freight to 12½¢ per 100 lbs., both to Chicago and New York, and the probability is that the Pennsylvania Company will do likewise; but everything else being equal, our business men are giving the former company the preference. Owing to alleged pany the preference. Owing to alleged discriminations on the part of the Pennsylvania Company, a bad feeling has existed here for several years against this corporation. here for several years against this corporation; hence it is not strange that our people
are inclined to give all the business they
possibly can to the P. & L. In these days
of small margins at best, the matter of transportation is one of vital importance.

In regard to the labor question nothing has
been developed, and it looks as if nothing
would be done until the present arrangement expires on June 1. It is intimated that
puddlers are willing to make a concession of

puddlers are willing to make a concession of 50¢ \$\pi\$ ton for puddling, and we presume, if so, that the rollers and heaters would also make a corresponding reduction; but mill-owners, it is said, will not be satisfied with a reduction of less than \$1 \$2 ton, and even then, it is claimed, they would be paying considerably more than is being paid for the same work in the East. However, all is surmise in regard to the result of the pending issue, but it is about as certain as anything every can be that, unless a reduction is made by the skilled laborers, there will be a general lockout, not only here in Pittsburgh, but throughout the West.

Pig Iron.-The general position of the market remains much the same as noted in our last report; business continues quiet, and we cannot reasonably look for any improvement until the labor question is disposed of. The mills, in view of a lockout next month, are buying very spar-ingly, as they are anxious to close the month with as little stock as possible. month with as little stock as possible. Bituminous Irons may be quoted at \$20 @ \$21, 4 mos., for Foundry, and \$17.50 @ \$20 for Mill, the outside figure being demanded for standard brands of all-ore Red-short. Bessemer continues very quiet; there have been no sales made in this market for some time past, but in the Shenango and Mahe valleys, \$20 and \$20.50, cash, is the price quoted deliverable at furnace. Anthracite Irons are firm, as producers say they can do better in the East than at prices current here; hence the offerings from that point are comparatively light. Coke Irons are firmer, but unchanged, selling at \$16, cash, to \$16.50, 4 mos., for Mill.

Manufactured Iron.—There has been nothing particularly new developed during the past week. Business continues in an unsettled and unsatisfactory condition, owunsettled and unsatisfactory condition, owing to the uncertainty attending the labor question. Manufacturers, as a rule, are not disposed to make any large contracts, particularly for future delivery; and prices, while no higher, are firmer than they were a few months ago. A mooted question is whether the heaters and rollers, in case of

me of the mills. The general opinion is some of the mills. The general opinion is that they cannot well get out of it, in view of the fact that the puddlers were paid the regular rates for puddling the Muck Bar in question; but what the rules of the Amalgamated Iron Association are in regard to the matter, we do not know. We continue to quote prices on a basis of 1.70\$ @ 1.75\$, 60 days.

fo days.

Nails.—While there has been no general advance, Nails cannot be purchased at the bottom rates of a month ago. Manufacturers here are doing next to nothing, refusing to sell except in small lots to regular customers, and then at very full prices, and, from what we can learn, this same feeling prevails at Wheeling and elsewhere in the West. Nails have been selling at a loss in the West all the year, and without any good reason therefor. We now quote at \$2,60 days, 2 per cent. off for cash, for small lots to regular customers.

Horse and Mule Shoes—Are still quoted

Horse and Mule Shoes—Are still quoted in 100-keg lots at 31/4 and 41/4, cash, with special rates for larger lots. Railroad Spikes-Unchanged at 21/4,

Wrought-Iron Pipe.—There is an increasing volume of business. Some of our mills are working up to their full capacity and unable to keep up with their orders, but prices are no better, and herein is the

great source of complaint. Discount on Gas, Water and Steam Pipe, 65 @ 70; Boiler Tubes, 50; Oil Well Casing, 65 @ 72½; do. Tubing, 18 @ 20 P cent. At these rates, it is claimed, there is no margin for profit to manufacturers.

Rails.-The Edgar Thomson Co. have

made no recent sales, not because there was an absence of inquiry, but in consequence of the fact that they have orders sufficient to absorb their entire production until October. Old Iron Rails are in light supply for imme diate delivery, and may be quoted steady at \$22 @ \$22.50, with considerable inquiry. Old Steel Rails, in the absence of sales, are

quotable at \$25 @ \$26. Steel.—There is nothing new to record in regard to this important interest; business continues active and mills have all they can do, and while prices remain unchanged, the tone of the market is firmer. The Steel in-

tone of the market is irmer. The Steel interest of this country never was in a more prosperous condition than at the present time, and its growth within the past few years has been wonderful. Notwithstanding the largely increased capacity, there is a demand for the entire product.

Scrap.—The market presents no new or mportant features that we are aware of; business continues rather quiet, while prices have undergone no recent change. No. 1 Wrought Scrap, \$22 @ \$22.50, net; Wrought Turnings, \$14 @ \$15; Car Springs, \$30 @ \$31; Car Axles, \$27 @ \$29; Old Car Wheels, \$19 @ \$20, gross; Cast Borings, \$10.50 @

Window Glass.—Business continues quite window (Hass.—Business continues quare active; manufacturers are generally well supplied with orders, and the outlook is favorable for a good trade all summer. While prices are better than they were early in the year, the margin for the manufac-turer is still small, but hopes are entertained of a further improvement in this respect before long. We continue to quote 75 % and 5 % off for car-load lots.

5 % off for car-load lots.

Coal.—Owing to the low water in the river there have been no shipments for some time, and the down river markets are firmer and higher in consequence. At Cincinnati there has been quite an advance recently, with a very light stock in first hands, and if navigation continues suspended much longer there will, no doubt, be a still further advance, not only there, but at other points depending upon Pittsburgh for supplies. It is estimated that there are 15,000,000 bushels loaded in boats and barges ready to move as soon as there is sufficient water, and some firms, having all their water, and some firms, having all their boats loaded, have been compelled to stop

Coke.-There is no abatement in the de-CORe.—There is no abatement in the demand, and, notwithstanding the misty outlook of the Pig Iron business, prices continue firm, the recent advance being well sustained. Producers all appear to have plenty of orders. Prices are quoted at \$1.15 @ \$1.25 % ton, deliverable free on cars at ovens.

Petroleum.—The only new feature to note is that the bill pending in the Legislature, proposing a tax of 5¢ \$\varphi\$ barrel, has been defeated, and it is expected the other measure, requiring a tax to be taken out for every new well, will meet with a similar fate. There is a very decided opposition in the producing region to measures of the kind in question.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., CHATTANOODA, May 19, 1879. The first of the week was hot, dry and discouraging to farmers. The last three days have been showery, some heavy rains falling but not lasting long. The whole face of nature has been changed from a brown, parched appearance to one of dark and vig-orous green. And the improved prospect of crops has reacted on business, and buyers and sellers are more cheerful. Manufacturers generally have all they can do. No stocks have accumulated. There is no falling off in prices.

Pig Iron.—The movement west of Texas has been considerable during the week. South Pittsburgh has blown in stack No. 18 and had excellent luck with it. There has South Pittsburgh has blown in stack No. 18 and had excellent luck with it. There has been no halt or hitch at all; she was making 50 tons per day of fine No. 1 Foundry on the 14th. Several car loads of the product have been shipped to Indianapolis. There is a pretty full supply of all grades in the market. Coke Irons—No. 1 Foundry, \$17.50 @ \$18.50; No. 2, \$16 @ \$17; Gray Forge, \$14 @ \$15; White and Mottled \$12 @ \$13. Hot-Blast Charcoal—No. 1 Foundry, extra, \$20 @ \$21; ditto, \$18 @ \$20; No. 2 Foundry, \$16 @ \$18; Gray Forge, \$16 @ \$18; White and Mottled, \$15. Cold Blast Charcoal—Car Wheel Metal, \$22.50 @ \$27.50; do., Extra Standard, \$24 @ \$29.50; Forge, \$17 @ \$22.

Ores.—Brown Hematite, 50 to 56 %; per ton, \$1.75 @ \$2.25. Red Fossiliferons, 50 @ 56 %; per ton, \$1.20 @ \$1.60. The above prices for ores delivered in Chattanooga on cars, or on the wharf from flat boats.

Nails.—Demand good; mills have all they can do, with orders ahead. The outlook for a good business for the summer is fair. We quote at \$2.25 rates, usual discount on job

Manufactured Iron—As usual at this season, the market is dull, but prospects, ahead are good. Manufacturers confidently expect a good summer trade. We quote: Bars, 2¢; Railroad Spikes, 2.50¢; Light Rail, 2.25¢; Track Bolts, 3¢; Trestle Bolts, 4¢. Coke.—We quote 11¢ @ 15¢ per bushel for washed foundry. Furnace, full supply at \$2 per ton, free on cars at Chattanooga or South Pittsburgh.

Coal.—There is no change in the market nor in prices. We quote run of mine, free on cars in Chattanooga, at \$1.25 @ \$1.75 @ ton. Lump, as per quality, 10¢ @ 12¢ @

Pig Lead-4¢; Ingot Copper, 18¢. Iron Rails.-We quote at \$35 % ton.

BOSTON.

MAY 16.—Pig Iron continues active and firm, and with an upward tendency. The prices from the Boston stores and wharves for small lots are \$21 @ \$23 for No. 1, and \$10,50 @ \$20,50 for No. 2. Manufactured Iron.—Bar continues firm and in fair demand, from the stores at 2¢ \$\mathbb{P}\$ is for Refined and 1%¢ for Common. Nails are selling at \$2.25 \$\mathbb{P}\$ keg. Sheet Iron, though in light demand, as usual at this season of the year, is firm at 2¾¢ @ 3¢ for single Common and 3¢ @ 3¼¢ for double do.; 3½¢ @ 4¢ for Refined; 6¼¢ @ 6½¢ for Galvanized, Nos. 14 to 20; 6¾¢ @ 8½¢ for Galvanized, Nos. 14 to 20; 6¾¢ @ 8½¢ for Russia perfect, and ½¢ less for do. No. 1 stained. Plate Iron is in good request at \$2.30 for Tank, \$2.50 for C. No. 1, \$2.75 for Shell, \$3.75 for Flange. These prices are from the mills. Small lots from the stores readily command an advance of 25¢ @ 50¢ above these fearnes. MAY 16 .- Plg Iron continues active and the mills. Small lots from the stores readily command an advance of 25¢@ 50¢ above these figures. We quote American Tool Steel at 12½¢@ 13½¢; English do. at 14½¢@ 15½¢; American Spring Steel at 5¢@ 6¢; English do. at 7¢@ 7½¢; Tire Steel at 3½¢@ 4¢; Bessemer Machinery at 4¢@ 5½¢, and Cast do. at 5¢@ 6¢. Copper continues quiet, but with holders very firm at 16½¢@ 16½¢ for Lake. For manufactures New Sheathing sells at 22¢; Braziers, 24¢@ 26¢, and Bolts, 24¢; Yellow Metal Sheathing sells at 14¢@ 14½¢ for American and 12¢ for English in bond. Lead has taken an upward turn, and closes a quarter higher for Pig, which we new quote at 3½¢ in large lots. For smaller lots from store, we quote: Pig, 3½¢@ 3¾¢; Lead Pipe, 4½¢; Tinlots. For smaller lots from store, we quote: Pig, 3½\$ @ 3¾\$; Lead Pipe, 4½\$; Tinlined Pipe, 12\$; Bar Lead, 6\$; Sheet Lead, 5½\$; Block-Tin Pipe, 30\$; all of these excepting Pig are subject to the usual trade, or 10\$ discount. Antimony is still in light demand, and has settled down to 12½\$ @ 13\$. Spetter continues dull at 4¾\$ @ 5\$, according to size of lots and brands. Tin is quiet, but holders are firm at our last quotations, and with a brisk demand an advance of ½\$ would confidently be looked tations, and with a brisk demand an advance of ½¢ would confidently be looked for. Straits are held at 14¼¢ for large lots. For smaller lots we quote below: Straits, 15¢ @ 15¼¢; Banca, 18½¢ @ 19¢; English L. & F., 15½¢ @ 16¢. We quote Plate Charcoal I. C., \$6.50 @ \$7; Coke, \$5.25 @ \$5.75, and Charcoal Terne, \$6 @ \$7.75. ercial Bulletin.

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of Messrs. E. L. HARPER & Co., under date of May 17, write us as follows: We have to report a steady demand for nearly all grades of Foundry and Forge Irons, without any noticeable change in prices. We are now nearing the usual dull season, and it is not expected prices will improve at present. Stocks not being heavy it is not probable, however, that quotations will range much, if any, lower during the summer months. We note again a good movement in Old Rails.

Rails.
HOT-BLAST FOUNDRY.
Hanging Rock C. C., No 1
Hanging Rock Coke and S. C., No. 7, 77,50 @ 20,00
8. C., No. 2., 15.00 @ 17.00
Virginia Coke, No. 1
Shawnee Am. Scotch, No. 1 20.00 6 S. C., No. 2 17.00 6 18.00
Hocking Valley S. C., No. 1 19,00 @ 20,00 S. C., No. 2 17,00 @ 17,50
FORGE IRONS.
Hanging Rock, No. r. C. C. 19,00 © 10,50 Hanging Rock, No. r Coke. 17,00 @ 17,50 Longdale, No. r Coke. 18,00 @ Alay and Tenn. No. r C. C. 17,50 @ 18,00 @ Red-short, No. r Coke. 18,50 @ 19,50 Cold-short, No. r Coke. 18,50 @ 19,50 Cold-short, No. r Coke. 18,50 @ 19,50 Cold-short, No. r Coke. 18,50 @ 19,50 @ 10,50 Cold-short, No. r Coke. 18,50 @ 19,50 @ 10,50 Cold Rails, prime. cash, @
CAR WHEEL AND WALLEABLE.
Hanging Rock C. B. 28.00 Ø 30.00 Cherokee C. B. 28.00 Ø Southern and Western Brands. 26.00 Ø 28.00

BALTIMORE.

Mr. W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of May 19: This market has ruled quiet and rather heavy for the past week; though values continued to the continue of the conti tinue firm and unchanged at annexed

•	ngures:
	Refined Bar Iron, 1 to 6 by 36 to 1 1 to 1.90 @ 2 6
1	" ' 1 to 4½ by 1½ to 2 " 1.90 @ 2 \$
ď	and Square
	Hoop Iron, 11/2 wide and upward. " 2% @ 2%
	Band Iron, from 11/2 to 4 in, wide. " 21/4 @ 2/49
2	Horse-shoe Iron " 3 @ 3%
8	Norway Nail Rods " 434 @ 5%7
	Black Diamond Cast Steel. " 12½ @ 13 Machinery Steel. " 7 @ 8
	Cast Spring Steel " 4¾ @ 5¼
	Homogeneous Steel Plate " 5 6 5787
	Common Horse Nails " 10 @ 14.
	R. R. Spikes, 5½x9-162½ @ 2½\$
	Perkins' Horse shoes, \$\text{\$\text{Reg of 100 lbs.}\$3.37\text{\$\exitit}\$\$\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$
	" Mule shoes 4-37%
ı	Putnam Horse Nails 10 10 10 20 21 235
и	a second a second a second

Globe Horse Nails..... B D 18 19 20 21 234 Less list discount to the trade. Messrs. R. C. HOFFMAN & Co., Iron and

Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of May 19: The Iron market shows but little change. The demand is fair and prices about as last reported, viz:

Baltimore Charcoal Wheel Iron.....\$26.00 @ 28.00 Virginia

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Fur Mr. Asa Saydes, from Merchant and Fur-pace Agent, writes as follows under date of May 19: With two or three exceptions our machine shops and foundries are actively employed. The demand for iron is fair and

DLICER III III.						
Clooteh	Pig In	on		\$21.50	0	22.50
Anthracite, No. 1.		******		20.00	@	21.00
Antiliacite, No. 2.				18.00	0	19.00
44 No. 3.			******	17.00	0	18.00
u Mottle	d			14.50	0	15.50
Coke, No. x				19.00	0	20,00
1 No. 2				18.00	@	19.00
97				16.50	0	17.50
Va. Cold-blast Cha	reoal.	Cold-	short	20,00	0	23.00
STA		Neut	ral	27.00	0	28.00
Va. Warm-blast	66	Cold-	short	18.00	0	31.00
Tie	66		hort	17.00	0	18.00
Old Polls				18.50	0	19.50
Www.ght Scrap No	D. X			17.50	0	19.00
Clear II III	nachir	nerv).		15.00	0	16.00
Dishmond Refined	Bar l	ron		20.	0	
Horse Shoes per k	eg	*****		***	0	4.00
Malo 44					0	5.00
Millo Mai	la Cita	broke	Stign 90		-	

by sail. Freights to New York, \$1.60 per ten of 2240 lbs

LOUISVILLE.

W. B. BELENAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, under date of May 19, write as follows: A very lively movement has characterized our local Iron market during the past week, which may be partly due to the low stage of water in the river and consequent slow deliveries from up-river mills. A general disposition is manifesting itself on the part of buyers to order more liberally than heretofere. The tone of the market is unmistakably cheerful and confident Crops continue to look well in spite of drouth in many places. Growers of both cotton and tobacco are much encouraged by prospect of remunerative prices. Advices from the South in regard to yellow fever have nearly dissipated all apprehensions of any renewal of its ravages the present sea-son. There is no fever at Vera Cruz, and very few sporadic cases at Havana, and the best medical authority predicts an unusu-ally healthy season. We look for a rapid ally healthy season. We look for a rapid recuperation of material prosperity at the South, and a better trade than usual during

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.) LONDON, ENG., May 5, 1879. THE POET'S MONTH

finds us hopeful, but not so advanced in a material sense as one could wish since the advent of this year. We are certainly not in a worse position than we were at that time; indeed, in several respects we are better off, but the situation as a whole is not pregnant with that amount of business which we had hoped would have come upon us during the spring quarter. On the other hand, we have not retrograded, so that we have at least that negative comfort. There are gleams of hopeful sunshine around us nave at least that negative comfort. There are gleams of hopeful sunshine around us and in the distant horizon in various directions, but—again that but—the warm rays of tentative prosperity are chilled and held in check by the cold east wind of doubt and poverty—just as the actual sunshine of the time being is nipped by the bitter blasts of the northeaster, which is key enough to pierce one to the very marrow. Taking yet another view, we fancy we can perceive materials for hoping and believing that we are on the borders of that happy land in which active occupation goes hand-in-hand with remunerative profits. I had the pleasure and satisfaction of hearing some very hopeful and encouraging expressions the other day from the lips of Mr. W. H. Brittain, Master Cutler of Sheffield, who spoke at a dejetiner, held in connection with the opening of the exhibition of cutlery here. Mr. Brittain said he could see a silver lining to the terribly black cloud of depression, under the shadow of which we have as long to the terribly black cloud of depression, been. Already an improvement was clearly evident in the far West—whence the first signs of a change for the better were generally apparent—and especially in America.
Firms at Sheffield were daily receiving telegrams from the United States for goods, which showed the urgency with which they were required and the extreme bareness of stocks. Mr. Brittain said statistics showed that these periods of depression invariable. that these periods of depression invariably came about once in 10 years, and he thought therefore, that there need not be any un-usual alarm or discussion in connection with the present dullness of trade.

IN A SUBSEQUENT CONVERSATION (Mayor of Sheffield), I learned, privately, particulars which quite confirmed the accuracy of what the former gentleman had just before declared in public. Mr. Brittain is of opinion that stocks of hardware and many other kinds of manufactured articles. are so low all over the world (with one or wo exceptions in the Antipodes) that they must be replenished almost immediately an d that consequently the full revival of bus iness cannot long be delayed. His own busi tess, which is almost exclusively for-eign, has recently afforded him ample and satisfa ctory proof of this. He, as well as satisfa ctory proof of this. 110, as the the Mt lyor, is apparently convinced that your pre tective tariff is not destined to exist nuch lon ger in its present prohibitive shape, inasmuch as economic changes, the nature of which y, we may surmise, in the South and

for making and grinding the shears, but by dint of firmness has triumphed. The madint of firmness has triumphed. The machinery is now in working order, and Mr. Ward assured me that the results achieved are in every respect satisfactory—indeed, beyond his utmost expectations. The shears are cut out, shaped, finished and ground by mechanical means, and when completed they are not merely cheaper and more expeditiously produced, but are in all respects better and more uniform than the hand-made ter and more uniform than the hand-made goods. There is virtually no competition whatever in this branch of business. The leading Sheffield makers (of whom Mr. Ward is foremost) stand on such strong ground that they are enabled to clear all before them. Large quantities are sent into the United States—chiefly, of course, to California and the Territories out West—where they can be imported, in spite of the duty, and sold in defiance of all comers. Other large and profitable markets are found in the great sheep-farming parts of Southern Africa, South America, Australia and New Zealand.

THE MAY MEETINGS

are now in full swing here, and the streets are literally crowded with "good men and true" from all parts of the country, and even further afield. White ties and clerical even further aneid. White ties and ciercal habiliments predominate in the Strand and Fleet street, so that we are necessarily on our good behavior. The iron and steel men are also beginning to assemble in readiness for the Institute meetings on the three last days of the week, excepting Saturday. A very interesting gathering is anticipated, the chief item in the programme being, of course, the discussion of Messrs. Thomas course, the discussion of Messrs. Thomas and Gilchrist's new steel-making process by means of the dephosphorization of common pig iron in the Bessemer converter. Mr. Riley's new "brick" idea is also likely to be a revelation to many. You are aware that the Bessemer medal this year falls to the lot of Mr. Peter Cooper, of New York.

THE EXHIBITION OF CUTLERY.

which has just been opened here under the auspices of the London Cutler's Company, is a most interesting collection of all kinds of cutting instruments and appliances. There are three principal classes—general cutlery, swords and surgical cutlery—as well as a large collection of antiquities lent by the South Kensington Department and the Sheffield Public Museum. There are no foreign exhibits, so that the competition is exclusively between the London and Shefbarring, as Paddy says, an ex ample of plating from Birmingham, and a stand of emery and other polishing materials from a firm at Manchester. I have looked over the contents of every case in detail, and I am bound to state that the display does a great deal of credit to all con-cerned. I am, and have been for many years past, quite familiar with all the best and worst productions of Sheffield, and I am inclined to the belief that, although neither Rodgers & Sons, George Wostenholme's, Brookes & Crookes, Harrison Bros. & How-son and several other principal houses are represented, the work is superior in many respects to any turned out in recent years. London cutlery is, as a rule, good, but it is expensive and much of it of a "trade" nature, such as butchers', palette, &c. knives, tailors' shears, et id hoc genus omne. In the cutlery shops of the metropolis one In the cuttery snops of the metropolis one workman frequently completes an article—from the rough forging up to the finished glazing! At Sheffield, on the other hand, the subdivision of labor is most fully carried out, the forger being nothing but a forger and so on, fully 30 persons taking part in the construction of a knife.

THE CITY COMPANIES,

I may say, appear to be moving in the direction of reform at last, some of them being afraid, probably, of being roughly handled, in obedience to popular clamor, under the auspices of a Parliamentary Committee. Many of these ancient guilds are possessed of immense wealth (the accumulation of several centuries), which not a few of the several centuries), which not a few of them have simply regarded as a means of eating and drinking in the most perfect style attainable. They can confer their freedom (which, in most cases, confers a Parlia mentary vote in elections for the city), or it can be bought for sums ranging from £20 to £100. A further payment admits to the "Livery," or full membership, and election selects the Courts, Wardens and Masters, who have the reins of management. Several of these hoary guilds have had exhibitions, and a number have joined, or have promised to join, in a general scheme for the furtherance of technical education. A college and a large endowment for this purpose are ing organized—and these, if properly attained and worked, ought to be of great service to the members of the several trades as well as to the public. Many of the companies have scarcely any connection with the trades they purport to represent. Thus the Master of the Cutlers Company here is a gentleman in the leather trade; one of the Court is in the tea trade, another is a solictor, and so forth—in fact there are now but four cutlers connected with the society.

SCOTCH PIG IRON

has been in rather strong request on the whole. The continuance of the Durham miners' strike has not only hindered Cleveland competition abroad, but also the imports into Scotland of pig from that district. There are now 252,674 tons in Connal's stores, against 173,796 tons this date last year. The total shipments to date are 36,186 tons in excess of those for last year. Writing from Glasgow, on May 3, James Watson & Co. reported: "The Scotch iron market opened by Monday foregon the state." reported: "The Scotch iron market opened buoyant on Monday forenoon, a large business being transacted up to 43/10½, cash, closing quieter in the afternoon at 43/7½ per ton. On Tuesday the price receded from 43/9 (@ 43/5 per ton, and on the following day the market declined to 43/, improving in the afternoon to 43/3, cash. Yesterday inasmuch as economic changes, the nature of which y, u may surmise, in the South and West will phove too strong for your Eastern protectionists, and bring about a change which the majority of Englishmen deem absolutely nece stary for the continued prosperity of your treat country. Mr. Ward, the Mayor of Sheffield, is, as you know, head of the great edge-tool and sheep-shear making house of Ward & Payne. He has recently had a dispute with his grinders on strike. The shipments last week were 11,

the subject of the introduction of machinery 795 tons as compared with 8382 tons for the for making and grinding the shears, but by corresponding week of 1878." We quote:

	1.00		131 161948		* 1 TO THE R. P.
ALL AND ADDRESS OF THE PARTY NAMED IN				No. I.	No. 3
G. M. B., at G	lasge	W		44/	42/6
Gartsherrie.	46			47/6	44/
Coltness.	44	****		52/6	44/5
Summerlee.	44	2083030		46/	43/6
Langioan	46			50/6	43/9
Carnbroe	66			45/	43/6
Calder, at Por	et Du	ndas	COLUMN TO SERVICE	47/6,	43/6
Glengarnock,					43/3
Eglinton.	40 11	44		43/6	42/6
Dalmellington	C	60		43/6	42/6
Shotts, at Lei			*****	43/0	44/9
SHOWS, WE THE	Lillere			49/	44/5

is reported to have been received during the past few days for hematite pig iron by a house on the west coast of England—that is to say, in Cumberland. I am quite unable to state whether the report is authentic, but the statement in circulation is that the order is for 12,000 tons of these that the order is for 12,000 tons of these (high-class) pigs, and that the price is very little, if anything, over 50/ per ton. This quotation is, I presume, f. o. b., seeing that almost all the hematite works from Barrow, Ulverston, &c., up to the Solway, are situated close to the coast line. The freight to your Eastern ports will range from 2/6 to 5/ per ton, figures which will enable you to compare the quotations, delivered, with those on your side.

YOUR OIL TRADE.

particularly the Standard Company and the Bradford district producers, ought to "read, mark, learn and inwardly digest" "read, mark, learn and inwardly digest" the subjoined remarks of a correspondent of the fronmonger, in view of the present unpopularity in Europe of certain recent doings among your refiners:
"During the prevalence of extreme prices in the coal trade, several of the mineral oil companies were all but ruined; but now they arreasy not only to have recovered the

they appear not only to have recovered the ground they then lost, but are in a position to pay very good dividends. Young's Paraffine Light and Mineral Oil Company, whose headquarters are at Glasgow, are un whose headquarters are at Glasgow, are understood to be doing a good and profitable business, and in this they do not stand alone. The Oakbank Oil Company, for example, after providing for maintenance and depreciation of works, have agreed to pay a dividend this month to the shareholders of 20 per cent. for the past twelve months, and the shares of the company have improved the shares of the company have improved from 40/ to 43/6. The Broxburn Oil Com-pany held their annual meeting in Glasgow on Monday, and declared a dividend of 9 per cent., after providing for depreciation of works and the whole expenses of the formation of the company. carrying forformation of the company, carrying forward, besides, £1875 to the reserve fund.

The £10 shares of this company are now selling at £13.15/. This measure of prosperity is somewhat remarkable in these dull times, and there can be little doubt that the prices of these oils to the consumer will ere long be considerably reduced."

SULPHIDES FOR FUEL,

as used by Mr. Hollway's new process, is a subject which will, no doubt, receive early and careful attention on your side, especially in the copper districts of your Lake regions. Mr. Hollway, as you know, uses the sul-phides in the Bessemer converter as a means of combustion, and has been fairly successful hitherto. His experiments last week at John Brown & Co.'s Works, Sheffield, were as former trials, but there appears to be little or no doubt of the complete practicability of the idea. A detailed report of a discussion on the matter appeared in the Journal of the Society of Arts of May 3.

FROM SHEFFIBLD

the current reports are rather contradictory some writers on the trade of the locality being of opinion that there is not the slightest change for the better, while others are not change for the better, while others are not only full of hope, but prepared with solid facts in support of what they allege. As I have already stated, the Master Cutler of Sheffield is among the hopeful ones, and in confirmation of his speech I have just received a private note, which is of an equally satisfactory nature. My correspondent says that he hears in many quarters not merely more hopeful expressions, but statements of an actual increase of orders. At more than one large establishment the men have been put on full time, and at others the working hours have been increased. He believes, indeed, that the tide has fully turned, and is deed, that the tide has fully turned, and is of opinion that much of the better tone is attributable to American orders. In that he agrees with Mr. Brittain, and as both gentlenen are in a position to know whereo speak, I am inclined to credit their asser speak, I am inclined to credit their assertions in preference to those made from the opposite point of view. I understand that the lighter industries have, so far, benefited most largely by the spurt, and that at the large iron and steel works there is still a

great deal of plant unemployed. STAFFORDSHIRE AND BIRMINGHAM

furnish news which is of a moderately satis factory character, although the cheerful tidings thence also refer to the light, or hardware industries. The blast furnaces and mills of South Staffordshire, Shropshire and Worcester are hardly any busier than heretofore, consequently the output of pig and finished iron is on a most limited scale. A few government orders of respectable pro-portions are in course of execution for naval and dockyard requisites, as well as for heavy cools, otherwise the latest tidings from the neighborhood under notice are devoid of material interest. The lock makers of Willenhall are moderately busy, and the chain and anchor producers of Dudley, Tipton, &c., are doing a tolerable business on government and general, foreign and colonial account. At Wolverhampton and Birmingham the season industries—baths, traveling trunks and the like—are steadily engaged. neighborhood under notice are devoid of ma-The brass founders are very satisfactorily off for orders; indeed, this is a branch which has hardly felt the depression.

Many kinds of light goods—hollow-wares, tools washers screwe out rails. washers, screws, cut nails, &c., are again 5 to 10 per cent. lower by incre

SOUTH WALES AND MONMOUTHSHIRE

are rather busier, and preparations are in eby the output of some of the hand whereby the output or some of the large establishments can at any moment be doubled or trebled. At Dowlais and Ebbw Vale, for instance, there are hundreds of thousands of tons of Spanish, &c., ores in stock, and these are still being imported,

notwithstanding the sword which the Sidney Thomas-Gilchrist discovery suspends over the heads of the adventurers. The exports from Cardiff and Newport are tolerably well maintained. Last week they included 1025 tons of rails to Cronstadt and 323 tons to Vadevela from Dowlais, 750 tons of rails to Hummelvigen from Rhymney, 5 tons to Syra, and 278 tons pig to San Francisco from Barnes, Guthrie & Co. From Newport 850 tons only were exported, whereas 3330 tons of ore were received inward. Tin plates at and near Swansea are quite steady all round.

FOREIGN.

FRANCE. (Moniteur des Interets Materiele

(Monttewr des Interets Materiels.

Panes, May 4, 1879.—Metals.—There has been a reaction due to the tariff uncertainties surrounding us, and to the unsatisfactory state of business in England. Copper has been quite weak; a decline of 3.75 francs has to be noted in Chill Bars and 2.50 in Corocoro Ore. We quote: Chill Bars, 148.75 (2) 153.75; Ingots, 156.25; Best Selected, 158.25, and Corocoro Ore, 157.50. Havre is steady; they quote Chill Bars between 150.25 and 155. Marseilles is firm and unaitered; they quote small Refined Ingots, 160; Sheet Copper, 180; Bolts, 190; Sheathing, 190, and Yellow Metal Sheathing, 175. Tin.—This metal has tended steadily downward; the decline has been 2.50 to 5 francs the 100 km was a firm and unsitered; 150 to 5 francs the 100 km was 100 km price; the fact is that the works there have booked as many orders as they conveniently can. Meanwhile the Easter holidays have brought about a lull, but this being always the case, even in the briskest of spring seasons, no importance was attached to it. The Chaleassiere Steel Works, of St. Etienne will be transferred to St. Nazaire, and the Bietrix Company will henceforth be machinists merely. We hear they have just received large orders for machinery. The idea of transferring steel works from the interior to the coast seems to us a good one, for if they are to import ore, it will be all the cheaper. In the Meuthe and Moselle the blast furnaces are endeavoring to fix the the price of Pig Iron at 55 francs. Coal—Consumption has continued active and the supply light. Strikes are feared in the North and Pas de Calais.

BELGIUM.

(Revue Universelle.)

BRUSAELS, May 4, 1870.—Iron.—In the absence of large dealings during the week, ironmasters have been eagerly discussing the recent inventions made in England tending to cheapen steel production, and thus more and more doing away with Iron in the near future. This being a question of vital importance, affecting such colossal interests everywhere, it is not to be wondered at that the subject has become one of almost universal discussion in business circles in Belgium. To our countrymen who like to fill distant orders we recommend the Maravesti-Buzen Railroad in Roumania. The law authorizing this road stipulates that whatever cannot be furnished at home shall have to be carried out by at least five foreign works. The length of the line will be 60 miles and the cost \$4,\$60,000. An English government agent is said to be at Mons to contract for Bolts, Rivets and Screws. Coal.—Quite an important adjudication for 208,000 tons Coal has come off simultaneously at Llege and Charlerol for supplying the state railroads. The lowest price has been 4,03 francs per ton, and the highest 5,20 per ton. This is a low figure, and shows a notable decline since the September adjudication for a government supply. Quite a strike is announced from Flenu and Belle-et-Bonne, 7500 Coal miners having struck who insist upon higher wages than 2 francs maximum per diem. (Revue Universelle.

(Borsenhalle.)

Hamburg, May 3, 1879.—Metals.—The agitation going on in business circles about the new tariff law to be inaugurated has had a quieting effect upon the Metal markets in Germany, and this tranquility has been deepened by the unsatisfactory trade aspect elsewhere, especially in England. It cannot be denied that the spring trade has been much interfered with by this economical warfare in which most powerful interests are diametrically opposed to each other, deterring people from buv. in which most powerful interests are diametrically opposed to each other, deterring people from buying goods, because they do not know what they may be worth to-morrow. But our consumers have lost little by it, for if the improvement in Metals had continued, they would have bought a supply at rates a great deal dearer than any of the Metals will cost them to-day, the decline being a general one, in view of the extraordinary overproduction going on on all hands in every one of them. Copper has been quete but firm at 67,50 % 65 at Berlin, and at 65 % 72 marks the 50 kilos. here. Tin has been slightly more active, at 73 % 76.50 at Berlin, and at 73 % 76 here. Lead.—The German markets are decidedly weak; Tarnowitz, Hartz and Saxonian has sold at 14.75 % 75 at Berlin, and the various sorts here have been neglected at 15 % 78.50. Spetter.—Frices have declined to such a low figure that producers withdraw from the market and stocks are now diminishing.

Steel for the Brooklyn Bridge.-President Henry C. Murphy has mailed recently to steel makers in all parts of the country to steel makers in all parts of the country
the following circular, which explains itself: "You are hereby informed that the
time for receiving sealed proposals, by the
trustees of the New York and Brooklyn
Bridge, for the steel and ironwork of the
servered superstructure of the East River suspended superstructure of the East River Bridge, agreeably to the specifications here-tofore issued and communicated to you, is hereby extended until the 26th day of May, 1879, at 12 o'clock at noon, and you are re quested to send in bids for cruciale soon, which shall have the same consideration as other steel. No bids which have been sent in have been opened, but will remain un-opened until the day and hour above menned, and parties making the same are at liberty to withdraw them and make others if they are so disposed. The object of this circular is merely to correct a misapprehen-sion that crucible steel was excluded by the specifications from competition.'

Register Harper has filed his report in the case of the Superior Iron Company against miners. The value of the propert is roughly estimated at \$500,000.

In this case the Superior Iron Company filed a claim for \$300,796.10 against Springer Harbaugh as guarantor for David Matthias, who purchased the mills of this company. The register finds that of the sum mentioned the sum mentio tioned, \$300,000 was in the shape of a mort-gage and bonds, no part of which Harbaugh agreed to see paid. He was guarantor merely for the purchase money and an an-nual payment on account, but not for the

Incrustation and Scale in Boilers.

From Messrs. Babcock & Wilcox's new catalogue, entitled "Useful Information Pertaining to the Generation and Use of Steam," we take the following in relation to the subject of incrustations and scale in

Nearly all waters contain foreign substances in greater or less degree, and though this may be a small amount in each gallon, it becomes of importance where large quantities are evaporated. For instance, a 100-horse-power boiler evaporates 30,000 lbs. water in 10 hours, or 390 tons per month; in the comparatively pure (Croton) water there would be 88 lbs. of solid matter in that quantity, and in many kinds of spring water as much as 2000 lbs. The nature and hardness of the scale formed by this matter will depend upon the kind of substances hald in colution and automatics. held in solution and suspension. Analysis of a great variety of incrustations show that carbonate and sulphate of lime form the larger part of all ordinary scale, that from carbonate being soft and granular and that from sulphate hard and crystalline. Organic substances in connection with car-bonate of lime will also make a hard and troublesome scale. The presence of scale troublesome scale. The presence of scale or sediment in a boiler results in loss of fuel, burning and cracking of the boiler, predisposes to explosion, and leads to extensive repairs. It is estimated that the presence of one-sixteenth inch of scale causes a loss of 13 per cent. of fuel; one-quarter inch, 38 per cent., and one-half inch, 60 per cent. The Railway Master Mechanics' Association of the United States estimates that the loss of fuel, extra repairs, &c., due to incrustaof fuel, extra repairs, &c., due to incrusta-tion amount to an average of \$750 per an-num for every locomotive in the Middle and Western States, and it must be nearly the same for the same power in station-ary boilers. It is absolutely essential to the successful use of any boiler, except in pure water, that it be accessible for the removal of scale, for though a rapid circula-tion of water will delay the deposit and certion of water will delay the deposit, and cer-tain chemicals introduced into the water will lessen it, yet the only certain cure is periodical inspection and mechanical cleaning. This may, however, be rendered less frequently necessary and the use of very bad water more practical by the use of some preventives. The following are a fair sample of those in use, with their results: Waters containing bicarbonate of lime in solution may be caused to deposit a considerable portion of the same by simply heating to 212 degrees, which draws off a portion of carbonic acid and reduces the bicarbonate to the insoluble carbonate. This principle is the basis of a large number of heaters and "lime catchers," but it has no effect on other of heaters and

impurities. The addition of milk of lime or metallic zinc has a similar effect, and they have been used with success in waters charged with bicarbonate of lime, but on sulphate of lime

they have no action.
Oak, hemlock, and other barks and woods, sumac, catechu, logwood, &c., are effective in waters containing carbonate of lime or magnesia, by reason of their tannic acid, but are injurious to the iron and not to be recommended. Molasses, cane juice, vine-gar, fruits, distillery slops, &c., have been used with success so far as scale is concerned, by reason of the acetic acid which they contain, but this is even more injurious to the iron than tannic acid, while the organic matter forms a scale with sulphate of lime when it is present. All "anti-crustations" containing organic matter are to be avoided. M. Bidard's observations show that they help rather than hinder incrustation. Barrino chloride and milk of lime are used with good effect at Kruppe's works in Present with good effect at Krupp's works, in Prussia, for waters impregnated with gypsum. Soda ash and other alkalies are very useful in waters containing sulphate of lim converting it into a carbonate, and so form-But when ing a soft scale easily cleaned. used in success they cause foaming. ticularly where there is oil coming from the engine, with which they form soap. All soapy substances are objectionable for the reason. Petroleum has been much used of late years. It acts best in waters in which sulphate of lime predominates. As crude petroleum, however, sometimes helps in forming a very injurious crust, the refined should only be used. Rogers's tannate of soda is probably the best preparation for general use, but in waters containing much sulphate, it should be supplemented by a portion of carbonate of soda. For muddy water, particularly if it contains salts of lime, no prevention of incrustation will pre-vail except filtration; in almost every instance the use of a filter, either alone or in connection with some means of precipitating the solid matter from solution, will be found

The Destruction of the Stanton Coal Breaker.-On the 18th inst. the famou Stanton coal breaker, at Wilkesbarre, owned by Charles Parrish & Co., was destroyed by fire. The burned breaker is said to have fire. The burned breaker is said to have been the largest in the United States. Its machinery was of the very best description and very powerful. It was capable of hauling and crushing 1500 tons of coal aday. The bull pump for keeping the mine free of water cost \$40,000. All the other machinery in the breaker was on a gigantic scale. The origin of the conflagration was the mine fire, which was at the time raging, and which had, it will be remembered, caused an explosion fatal to a number of caused an explosion fatal to a number of miners. The value of the property destroyed

[Continued from page 15.] The American Institute of Mining Engineers.

Supper was served in spacious tents on the lawn, and excellent music was furnished by a symphony quartet in the music-room. THE PRESENTATION TO A. L. HOLLEY.

The selection of this time and place for a surprise, in the form of a presentation to Mr. A. L. Holley, of a silver pitcher and salver of unusual value and beauty, was a happy thought. While the company were at supper on the lawn the dining-room of the house was closed, and the gift placed in position and covered. About Ii o'clock the doors were opened; Mr. Holley, surprised and bewildered, was led in, and the guests

quickly filled the room. Mr. Shinn spoke as

Ladies and Gentlemen: Allow me to claim your attention for a few moments. A once prominent railroad official was known to define an engineer as a "man who knew what he wanted to do and how to do it, and he added, by way of illustration, that he was an engineer in that sense. The definition is not so wide of the mark as the as never knowing either what he wanted to do or how to do it. It must, therefore, be evident that a "mining engineer" is one who wants to mine, and knows how. In this sense I fear that many of us are in the same category with the railroad official referred to. Some of us sport the title of "civil engineer." It is presumably a reasonable requirement of all engineers to be civil, yet some of us find even that task difficult. here are yet others who masquerade under e designation of "mechanical engineers," the designation of and there is one of our number who has in posed upon a too credulous and confiding public with this title and sundry others, to which I will refer, until "forbearance has ceased to be a virtue," and it has fallen upon me to expose him before this intelligent

This gentleman, for such he seems to be appeared in this vicinity some years ago, and his theme was "blowing Bessemer steel." His ambition appeared to be to blow about something, and his greatest desire was to "blow a heat." This gentleman was always descanting upon converting things—and people. He made some convert and some converters, but such a failure was he in this direction, that those who came in contact with his converters found them-

selves consigned to a hotter place than they had ever reached before. The most remarkable characteristic of

the converts of this gentleman's converters is that they are always inclined to steel This gentleman also indulges in the title of sulting engineer," and frequently s his victims—whom he is pleased to call his clients—with a visit for consulta-tion. This visit results in his finding out all we know, and in return he confidentially tells us all that he don't know, and there is so much of the latter that he seems to doubt whether what he gets from us is a full equivalent. He occasionally goes abroad, to England and the Continent, and favors our foreign friends by "consulting" them in like manner. Anon, he talks of "basic linings," as if his ordinary schemes were not base enough; and you have heard him at this very meeting hold forth upon "teconomical case producers" as if such as it is not the second of "economical gas producers," as if such arti-cles were valuable anywhere outside of Congress and our State legislatures. But his propositions are so plausible, his manner so winning, his countenance so frank and open-hearth like, and his gas so overpowering, that he has admirers who still insis upon doing him honor; and it is because of this that I have sought to place before you the facts in regard to this gentleman's true characteristics, lest you might be misled into that confidence the burden of which these misguided persons have laid upon me this evening.

evening.

This gentleman's name you perhaps have heard, for it has a habit of getting into print—it is Alexander Lyman Holley. After all, Mr. Holley's blowing has been for Bessemer, for Siemens, for Tessié du Motay, for anyedy and evenybells avent. for anybody and everybody except Holley, and that victimized few, whose representa-tive I appear here to-night, have resolved that one blow at least shall be struck for

Alexander Lyman Holley.

Mr. Holley: In behalf of a few of those whose lives you have made a burden by teaching them the pathway to success in making Bessemer steel, and then leaving and the chemists—with their "analyses" and their "formulæ;" their moments of "this" and their units of "that"—I present you this testimonial, which I find characterized in the official catalogue as a "pitcher upon a plateau;" which is the "pitcher," you can doubtless perceive; which is the "plateau," I leave for your patient and careful investigation, believing that, as in other cases which you have undertaken, science will finally triumph and the "plateau" will be discovered. The catalogue further states that the figures on the pitcher are a symbolical representation of "art chasing nature." It is an undoubted fact that nature needs chasing, as witness sent you this testimonial, which I find charfact that nature needs chasing, as witness the too plentiful phosphorus in the conven ient pig iron; and as the art of Thomas & Gilchrist has now succeeded in chasing it out, so has your art chased nature out of many of her strongholds and forced her to deliver up her secrets to science.

In behalf of those whose names are re-corded herein, I beg that you will accept this testimonial as but a slight evidence of their appreciation of your great professional ability, your high moral worth, and as an in-dication of their steadfast friendship.

The gift was uncovered, and after a mo ment of embarrassed silence Mr. Holley, with tremulous voice, responded as follows

Mr. Shinn, I thank you for the kind and elegant manner in which you have presented

contribution to the development of our Beassmer manufacture. I am disposed to be modest man, but there is one thing which I certainly do claim to know more intimately than most people, and that is wh contributed to that somewhat remarkable development and what each one contributed development and what each one contributed. I am so proud to be recognized as one of the dozen men—(pointing to Capt. W. R. Jones) here is a conspicuous member of that dozen—who in the way of good mechanical engineering on the part of some of us, and good management on the part of others, have put the Bessemer process in the high and successful poistion which it occupies to-day. But, Sir, one of the first principles of our profession is to make constructions only upon mature working drawings. This sur-

apon mature working drawings. This surprise is so complete that I have had no

prise is so complete that I have had no chance to work up drawings and specifications of a suitable response; but that I will endeavor to do when I can more completely express my overwhelming feelings.

Among us all who are working hard in our noble profession and are keeping the fires of metallurgy aglow, such occasions as this should also kindle a flame of good fellowship and affection which will burn to the end.

Burn to the end-perhaps some of should think of that, who are burning the candle at both ends. Ah! well, may it so happen to us that when at last this vital spark is oxidized, when this combustible spark is oxidized, when this combustable has put on incombustion, when this living fire flutters thin and pale at the lips, some kindly hand may turn us down, not underblown—by all means not overblown—some loving hand may turn us down, that we may perhaps be cast in a better mold

The gift has a value of \$1250, but know ing the feelings which prompted the pre sentation, and the love which those who gave it bear him, to the recipient it must be priceless. A card secured to the lining of the case bore the following inscription :

Testimonial of appreciation and regard to Alexander Lyman Holley, from his friends, W. R. Jones, Morrell, Corning, Shinn, Griswold, Metcalf, Hunt, Wellman, Kennedy, Fritz, Hartman, Park, Lapsley, Teeter, Worthington, Hines, Perry, Fry, D. N. Jones, Marvin, Hamilton, Rickettson, Hemphill, Forsythe, Potter, McCandless, Rinard.

To all but the donors the presentation was a complete surprise. Mr. Holley's pathetic response brought tears to the eyes of most of those who heard it. As he will be on the ocean en route for Europe before these lines reach our readers, we are sure that many will join us in wishing him a pleasant voyage and a safe return to home and friends.

Friday's Session and Excursion

The last session for papers and business was held Friday morning. Mr. Thos. F. Witherbee, of Port Henry, N. Y., gave some ccount of "The Three Hearths at the Cedar Point Furnace;" Mr. Wm. Kent described an interesting apparatus for testing the resistance of metals to repeated shocks, accompained by a very able exposition of the importance of making such tests in connection with those made to asertain the ability to resist severe strains. The apparatus is a machine by which metals may be tested by repeated blows, numbering millions, if necessary. The test piece is a round rod of convenient length and diameter, and the blows are applied in the direction of the length, as in tension tests. A small nut, or anvil, is screwed or otherwise fastened on the bottom of the rod, and an annular weight is caused to drop repeatedly upon the anvil, by means of a rotating cam. The whole machine is built as rigidly as possible, to prevent spring, and the anvil being made strong to avoid the absorption, by its inertia, of the energy of the blow, the whole of the latter is transmitted to the test piece, straining it in the direction of its length. The weight of the drop being known and the hight of fall uniformly adjusted, each blow gives an impact of the same number of foot-pounds. A revolution counter attached to the driving shaft, indicates the number of blows that are given. President Cox made some remarks on the

subject of anthracite coal breaking, and exhibited a form of tooth which wore out with out changing its shape.

Mr. W. E. C. Coxe, of the Reading Railroad, spoke in reference to the comparative lity of iron and steel rails. He main tained that there was not a great difference between the best iron and best steel rails. Mr. Stone, in a paper read before the Iron and Steel Association, had stated that a steel rail would last as long as 25 iron rails. Mr. Coxe thought the proportion was about five to three in favor of steel, when the best specimens are taken.

A paper on "Phosphorus in Bituminous Coal" was to have been read by Mr. A. S. McCreath, chemist of the State General Survey, but as it had been printed and dis-tributed among the members, the author merely answered a few questions called out by

the desire for further information.

A paper prepared by Prof. Charles E.
Wait, on "Antimony Deposits in Arkansas," was read by the secretary. A communication was read from the Association of Mining Engineers, of Montreal, inviting the American Institute to hold its next session in that city; and also a communication signed by a large number of prominent citizens of that city, indorsing the invitation. The Chairman stated that the council had accepted the invitation, and that the next meeting would be held in September.

Resolutions of thanks to the railroad companies, to the managers of metallurgical and Childs, Capt. Dravo and others. A resolumanufacturing works and the press, were tion returning thanks to the Fayette County

THE DINNER.

Friday evening the subscription dinner, which has become a feature of the meeting of the Institute, was given in the new building of the Du Quesne Club. About 150 gentlemen and ladies attended, and enjoyed the ample feast and the speeches which fol-The banquet was a success in every lowed. particular. Mr. Rickettson, Mr. Weeks, Mr. Metcalf, Dr. Raymond, Mr. Holley, Mr. Park, Prof. Langley and others respon to toasts, and the average of the post-prandial eloquence was much higher than is usual on such occasions. The ladies, for most of whom it was a new experience, enjoyed it immensely, and voted with one ac-cord that henceforth they would accompany their husbands, or brothers or fathers, as the case might be, to the meetings of the

joyed it immensely, and voted with one accord that henceforth they would accompany their husbands, or brothers or fathers, as the case might be, to the meetings of the Institute.

Baturday's Excursions.

Saturday brought the members the disagreeable necessity of choosing between two equally agreeable excursions—to the oil regions of Butler County and to the Connellsville Coke district.

The excursion to the oil region left the Union Depot about 25 minutes after eight o'clock, on a special train furnished by the Pennsylvania Railroad Company. There were some 70 or 80 persons in the party, including a dozen or more ladies. The train went to Butler over the West Pennsylvania road, thence by a special train over the Butler, Karns City and Parker, Narrow Gauge railroad to Parker, and there took a special train on the Allegheny Valley Railroad. The first stop on the West Pennsylvania road was made at West Pennsylva Sharpsburg, where the train was run up to Spang, Chalfant & Co.'s mill. Here the process of making lap-welded tubes, &c., was thoroughly investigated. The chief matter of interest to the visitors was the natural gas used in all the furnaces for fuel. This gas is brought in a pipe line from a natural gas well at Saxonburg, 17 mile from the mill. After leaving the mill the next stop was made at Saxonburg, where the gas well was visited. The well not only supplies far more gas than the mill can use but more than can be utilized by the Carbon Black Manufacturing Company, which has a large establishment at Saxonburg. In addition to supplying an immense quantity of gas to those two works, a huge flame is burning constantly at the top of a large pipe, about 15 feet above the ground. From this pipe the gas escapes with a roaring noise, and the heat made by the flame can be felt for a considerable distance. The Carbon Black Works were visited by all. even the ladies, notwithstanding the heat of the works and the soot that covered

After leaving Saxonburg no stops were made until Butler was reached, where a change was made to a special train on the Butler, Karns City and Parker Narrow Gauge road. On this road about the only stop made was at Carbon Center, where the oil wells of H. L. Taylor & Co. were in spected, as well as a pipe line pumping staon. Another stop was made on the way to Parker, to allow the excursionists to look at some very high trestle work where the train crosses a deep ravine. At Parker City the train was run over to the Allegheny Valley Railroad, where a special train wa in waiting. This train was run up to Foxburg, where a stop of about an hour was made, and a substantial dinner, served by the Foxburg House, was enjoyed by the hungry visitors. Leaving Foxburg about o'clock, a very rapid run was made to Pitte burgh, the 88 miles being made in about : hours and 25 minutes, including stops. It was in every respect a delightful trip, and one long to be remembered by those who took part in it. One of the new open observation cars of the Pennsylvania Road was attached to the train on the West Pennsylvania road, and on the Allegheny Valley

The trip to the coke district presented fewer features of novelty, but all who went on it congratulated themselves that they had made so wise a choice. As this district was fully described in our issue of January 16, 1879, with a map, we need not recount the incidents of the trip. Mr. Joseph D. Weeks commanded the excursion, and carried it through in good style. The works visited were those of Brown & Cochrane, H. C. Frick & Co. and A. A. Hutchinson & Bro. At Frick & Co.'s a mine was visited, which gave the visitors a chance to inspect the celebrated Connellsville coal seam, which is here worked o feet in the clear. The vein is thicker than this, but as the slate does not make a very good roof, a portion of the coal is left to strengthen it. At Hutchinson's a number of ovens are building, which gave an opportunity to see the method of construction. The party then proceeded to Dunbar Furnace, where they were elegantly entertained by the Fayette County members, at the residence of Maj. A. B. De Saules, vice-president of the Furnace Co. Everything that goes to make up a first-class dinner was provided. The party were in good condition to accept of this hospitality, and never was a meal more heartily enjoyed. After dinner a meeting was organized and brief addresses were made by Joseph D. Weeks, A. H. elegant manner in which you have presented this lovely gift; it is not only a surprise but an astonishment, so much so that I am atterly unprepared to properly respond.

My kind friends have intended this delightful presentation as a recognition of my the United States Iron and Tin Plate Works.

appointed for the return trip," the train, after waiting half an hour, started without them and arrived in the city shortly after 6 o'clock. Through the courtesy of the management of the Baltimore & Ohio Rail-6 o'clock. road, the party left behind were enabled to board the mail train, and they arrived in the city two hours later. Saturday evening many of the members left for their homes,

and the party broke up.

A remarkable feature of this meeting, in addition to the large attendance, was the great increase in membership. The following is a list of new members ele ing is a list of new members elected:

Octave Chanute, chief engineer N. Y., Erie and W. R. R.

Luther S. Bent, general superintendent Pennsylvania Steel Works, Harrisburg, Pa.

George Bartol, chemist Otis I. and S. Co., Cleve-

John Rinard, Edgar Thomson Steel Works, Bhaddock's, Pa.
Henry W. Rathbone, Eimira Rolling Mill Co., Elmira, N. Y.
Chas, S. Price, Johnstown, Pa.
Richard D. A. Parrott, Greenwood Iron Works,
Greenwood, N. Y.
Ferguson G. Parker, Cambria Iron Co., Johnstown,
Pa.
Wm. Hamilton Merritt, St. Catharine's, Ontario.

Ferguson G. Parker, Cambria Iron Co., Johnstown, Fa. Wm. Hamilton Merritt, St. Catharine's, Ontario. Wm. Lilly, Mauch Chunk, Pa. Alex. J. Leith, manager Joliet I. and S. Co., Chicago, Ill. Julian Kennedy, Edgar Thomson Steel Works, Braddock's, Pa. Reese James, Johnstown, Pa. C. C. Hussey, Pittaburgh, Pa. Abraham T. Hay, Burlington, Iowa. Wm. D. Hartupee, Pittaburgh, Pa. Henry Hargreaves, South Pittsburg, Tenn. Ignatius Hahn, Pittsburgh, Pa. Paul A. Tuss, manager Laclede Rolling Mills, St. Louis, Mo. Chas. A. Fitshugh, Pittsburgh, Pa. Henry F. DeBardeleben, Birmingham, Ala. Wm. B. Crocker, New York. Andrew Cosgriff, Brewster, N. Y. Theodore Cooper, New York. James Morgan, American Iron Works, Pittsburgh, Pa. Edward L. Ford, American Iron Works, Pittsburgh, Pa.

James Morgan, American Iron Works, Pittsburgh, Pa.
Redward L. Ford, American Iron Works, Pittsburgh, Pa.
Albert H. Childs, Allegheny, Pa.
H. C. Fricke, Pittsburgh,
Walter S. Franklin, Ashland, Md.
Henry T. Townsend, Philadelphia.
Henry M. Curry, Pittsburgh.
Wm. L. Scaite, Pittsburgh.
H. T. Mann, Pittsburgh.
Chas, H. Morgan, Worcester, Mass.
Geo. L. Miller, Latrobe, Pa.
Thos. T. Morrill, Johnstown, Pa.
Jas. Laughlin, Jr., Pittsburgh.
Herbert Du Puy, Pittsburgh.
A. A. Hutchison, Fittsburgh.
A. A. Hutchison, Fittsburgh.
John D. Saunders, Mine la Motte, Mo.
F. Z. S. Challenberg, Irwins, Pa.
John I. Wilson, Pittsburgh.
John T. Wilson, Pittsburgh.
John T. Woung, Pittsburgh.
The following gentlemen were elected as-

The following gentlemen were elected as sociates:

Horace M. Barry, New York.
W. B. S. Reed, Brooklyn, N. Y.
T. S. Mathis, Windham, Ouray County, Col.
Edgar Richards, New York.
Geo. F. Milliken, New York.
E. V. McCandless, Pittsburgh.

One word more about the hospitality extended to the Institute by the citizens of Pittsburgh. It was simply immense. Nothing was left undone by them which could in any way have contributed to the enjoyment of the members and ladies, and whatever they did was done with the thoroughness and precision of competent business men The excursions, without exception, were managed perfectly, and there was not one delay nor one disappointment. To those who attended the Pittsburgh meeting, it will ever be a pleasant memory; to those who did not, it should be a life-long regret.

Increasing the Adhesion of Light Locomotives.

The want of adhesion in light locomotives rious obstacle to their introdu tion upon cheap railways. In locating such railways in rough countries, a considerable expense must be encountered in order to secure reasonable gradients which a light engine can overcome, for if the grades be sharp, the permanent way must be increased in weight and solidity in order to sustain the heavier requires recovers the heavier engines necessary to overcome the grades. As ordinarily calculated, the tracgrades. As ordinarily calculated, the tractive power of an engine is only equal to about one-fifth, or perhaps, under favorable circumstances, one-fourth of the weight resting upon the drivers. Hence it is that a light engine, which can have a considerable excess of adhesion over that due simply to the resting weight upon smooth drivers, is very desirable. We have recently examined some inventions of Mr. Geo. French, of 2004 East Twenth-sighth street. New of 200½ East Twenth-eighth street, New York, which are intended to increase the York, which are intended to increase the adhesion of light engines without adding to their weight. One of these, and perhaps the most easily applied, is intended for light engines of the Mogul pattern, such as are extensively used in this country upon railways of the lightest kind. The construction of the engine in general is not changed, but the trailing wheels are furnished with a pair of grooved tires, the groove being just deep enough to firmly grasp the head of the rail. These wheels do not rest upon the track in the regular work of the engine, but when it is necessary to increase the adhesion, as upon necessary to increase the adhesion, as upon an up grade, they are lowered, and the head of the rail is grasped in the grooves of the wheels. This gives all the adhesion needed. The jaws between which the driv-ing boxes of these axles are held are not straight, but curved to a radius equal to the

distance of the centers of the middle wheels, consequently in rising and falling they move in an arc of a circle, which has the centers of middle drivers for its center. In this way they are free to revolve in the sual manner, and the action of the side rods are in no way hindered whether they are raised or lowered. The amount of adhesion which can be gained by a pair of grooved wheels of this kind is very great indeed. In some experiments which we have seen made with models, we judged that the adhesion was much more than doubled without any increase of weight. We saw a small model draw a very respectable load, upon a grade which was equal to about 680 feet to the mile, which is steeper than any grade we know of save those upon "mountain" readways where cogged wheels are used. The amount of adhesion possible, with any given weight, is only limited by the strength of the material of which the tire is made. For light roads, which are to run into the country as feeders for trunk lines. distance of the centers of the middle wheels strength of the material of which the tire is made. For light roads, which are to run into the country as feeders for trunk lines, this improvement seems likely to be valuable, as it will enable the lightest classes of engines to overcome steep grades with their ordinary loads, and without the assistance of heavy pushing engines. Mr. French has, in addition to this plan, another hy which the truck wheels of a light engine. Assistance
French has, in addition to this plan, another
by which the truck wheels of a light engine
can, upon grades, be utilized as drivers,
and so increased adhesion be obtained. The
grooved wheel, however, has many advantages over the other plan. As the wheel tages over the other plan. As the wheel does not come into play except upon grades, or when extra power is needed, there is said to be no difficulty in passing frogs and switches. Owing to its peculiar construction, we think the witches without difficulty. tion, we think the wheel might run over a frog or pass switches without difficulty. For mining roads, engines upon this plan would seem to be especially valuable, as their light weight would render it possible to build a very cheap permanent way, while their great tractive power would enable them to haul large loads over the roughest

Colliery Explosions.

At a recent meeting of the Royal Society, Mr. W. Galloway made a communication embodying the results of experiments he had conducted on the influence of coal dust in colliery explosions. This is the second paper he has written on the subject. Those who are interested in the questions converted. who are interested in the questions connected who are interested in the questions connected with coal-mine explosions will find that Mr. Galloway has investigated several of the causes that originate them. In his former paper he stated that a certain mixture of air and coal dust, not inflammable at ordiof air and coal dust, not inflammable at ordi-nary pressure and temperature, becomes so when 0.892 per cent. of fire-damp (by vol-ume) or more is added. It then burns freely with a red, smoky flame. In a dry and dusty mine an explosion may extend itself to remote parts of the workings where fire-damp is quite unsuspected. The wetness or dryness of the workings depends on the tem-perature of the strata in which they are situated, for if the temperature of the mine situated, for if the temperature of the mine is lower than the dew point of the air at the surface, the ventilating current will deposit moisture as it becomes cooled in passing through the workings; and if, on the other hand, the temperature of the mine is higher than the dew point at the surface, the ventilating current will absorb moisture and tend to produce a state of dryness. He then pointed out that the temperature of the strata in the coal measures of this country increases at the arts of cheeps. strata in the coal measures of this country increases at the rate of about 1° F. for every 60 feet below the surface, and therefore the comparative wetness and dryness of a mine depends on its depth. He has found that his own observations gave these results, that mines shallower than 400 feet are damp, and those deeper than 700 feet are dry and and those deeper than 700 feet are dry and and those deeper than 700 feet are dry and dusty. Between the 400 feet and 700 feet there is a kind of debatable ground, in which wetness or dryness depends for the time being on the temperature of the air entering the mine at the surface.

In all dry coal mines the coal dust lying on the floor of the roadway rises in clouds and fills the air when it is disturbed by the pressure of men beyong and a

and fills the air when it is disturbed by the passage of men, horses and wagons, and a sudden puff of air, such as that produced by a local explosion of fire-damp, or by a shot blowing its tamping, rust necessarily produce the same effect in a greater or less degree, according to its intensity. Although 0.892 per cent. of fire-damp will cause an explosion, it is probable that under compression in a confined space a less amount may explosion, it is probable that the same in a confined space a less amount may have the same effect. Mr. Galloway probable that some kinds of coal pounded the theory that some kinds of coal dust may, perhaps, require less fire-damp than others to render their mixture with air inflammable, and suggested that still other inds may form inflammable mixtures with ure air. On the other hand, he mentioned pure air. On the other hand, he mentioned an experiment with the return air of a mine, where he found the air had to be black with dust before ignition occurred. He mentioned dust before ignition occurred. He mentioned that it was a favorite theory that fire-damp suddenly bursting from strata would cause an explosion of wide extent, and that traces of it could afterward be found in the charring of the timber used in the mine. This so-called appearance of charring was, he said, due to a coating of the coked coal dust adhering superficially. The practical suggestion made was that roadways in mines should be kept well watered to lay the coal dust. In the case of the Dinas explosion (of the 13th the case of the Dinas explosion (of the 13th of January), he had found, on his last visit of January), he had found, on his last visit before the explosion, that the water carties were not being used. The manner, he said, in which coal dust operates in setting fire to coal and timber, is probably as follows: The air is traveling rapidly in one direction along a gallery, throwing a continuous shower of dust, small pieces of coal, &c., expired all surfaces in the course. At the against all surfaces in its course. At the instant the flame traverses it the coal dust is melted. It then assumes the properties of flaming pitch, adheres to the surface against which it is thrown, and rapidly accumulates until it forms a crust of greater or less thickness, according to the length of time the air continues to travel in the same direc tion. If there is enough of air it will continue to burn; but if not, it is soon extinguished, a covering of "coke" results, and there is the appearance vulgarly called "charring."

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The London Exhibition of Catlery.

The London Cutlers' Company recently opened an exhibition, consisting entirely of specimens of cutlery shown by both manufacturers and workmen. The principal object of the company in promoting the exhibition was the advancement of technical education in all branches of the cutlery trade; and with this view they gave money prizes to artisans, and medal and certificate awards to manufacturers, with, in case of exceptional excellence, the freedom of the company. The Sheffield Cutlers' Company co-operated with the London Company in carrying out the scheme, and several Sheffield manufacturers and artisans exhibited specimens of local work which, claims the Sheffield Daily Telegraph, "prove that the hands of Sheffield men have not lost their cunning in their own particular industries." cunning in their own particular industries."
The South Kensington Museum exhibited

cunning in their own particular industries."

The South Kensington Museum exhibited more than 300 curious and ancient swords and pieces of cutlery, some of which a correspondent of the Ironmonger describes: "Among the more prominent weapons were a Tulwar sword, with curved watered blade and steel handle, damascened with gold; another Tulwar, with grooved and channeled blade, copper handle and guard, also engraved and damascened with gold; an Indian sword, with broad curved blade, strengthened at the back and lower part with extra damascened plates, and with a handle with a broad guard and projecting pommel, also damascened with gold; a Tulwar sword, with a grooved watered blade, stamped with an inscription, a silver handle and ornamental guard, with birds and flowers in translucent enamel; a Sukhela sword, having a long, straight, two-edged blade, thickened with extra plates at the lower part, the handle having a broad guard and projecting pommel; a Tulwar sword, with a curved blade with serrated edge, steel handle and guard; a long sabre, with curved blade and jade handle, engraved with flowers; an Assamese (Indian) sword, with long steel blade, having a handle of iron and brass; a remarkable sword with a short curved blade and iron handle and guard, covered with silver and ornamented with a dragon's head at the extremity. guard, covered biade and iron handle and guard, covered with silver and ornamented with a dragon's head at the extremity. This was a talismanic sword formerly be-longing to the rebel Koer Singh, and taken from him during the mutiny in 1857. These weapons were mostly accompanied with their richly ornamented sheaths. In another case were specimens of except with another case were specimens of ancient scissors, chatelzines and sugar nippers of Italian and German make during the sixteenth and and German make during the sixteenth and seventeenth centuries. A conspicuous feature in this case was a pair of shears, or betel cutters, of steel, elaborately chiseled and inlaid with silver and brass, terminating in the head of a bird. The design of this curiosity proclaimed it to be of Oriental origin. A third case was occupied with curious old forks and spoons, one of the latter being of dark red jasper, and another havrious old forks and spoons, one of the latter being of dark red jasper, and another hav-ing a bowl of white shell and a stem of blue glass, with two balls at the end. Modern Turkish scissors, knives, forks and spoons, and Italian articles of a similar character, but of earlier date, were also shown in this case, together with specimens of Flemish, German, French and Norwegian manufac-ture. The most noticeable feature in an-other case was a dressing-case of tortoise. ture. The most noticeable feature in another case was a dressing-case of tortoise shell of hexagonal shape, with silver lock, hasp, hinges, handle and chain. This contained a looking-glass, four tortoise-shell combs and thirteen other toilet necessaries, mounted with silver. It is believed to have been given by Charles II. to a Mr. T. Campbell, who had sheltered him. In this case were also fine specimens of seventeenth century cutlery in the shape of knives and forks, and fantastically-designed knives, &c. In the other cases were Perknives and forks, and fantastically-designed knives, &c. In the other cases were Persian daggers of every conceivable shape and size, and richly jeweled; curious old French knives of the sixteenth century and specimens of German cutlery. A curious old knife-case of carved wood, dated 1564, should, however, be noticed. Three satyrs bound to a triangular pillar form the case, which rests on three sphynxes, and the cover is surmounted by a sphynx holding a shield. The cese contained six steel knives chased with gilt, each blade and handle being formed of one piece."

The workmen's show of cutlery was, it seems, very commendable. It dealt with the various stages of manufacture, from the

chased with gilt, each blade and handle being formed of one piece."

The workmen's show of cutlery was, it seems, very commendable. It dealt with the various stages of manufacture, from the rough forging to the granding and finished glazing processes. The majority of the artisan exhibitors were rewarded with merit certificates and with sums of money.

The London Cutlers' Company is a very old organization. Previous to the reign of Henry V, there were three trading fraternities or guilds in existence, viz., the Forgers of Blades, or Bladers, the Makers of Hafts and Sheath-makers. In the fifth year of the reign of Henry V, 1417, these were incorporated as one united body by the name and style of "The Master Wardens and Commonalty of the Mystery of Cutlers of London." Various other charters have been granted, viz., the charter under which the company is now governed, that granted by King James I, in the year 1607. This charter gives the company many powers, some of which had unfortunately died out. Then ter gives the company many powers, some of which had unfortunately died out. They had powers to make ordinances "for the had powers to make ordinances "for the government of all using the mystery, art or trade of cutlers within the City of London or suburbs thereof, and within three miles of the said city." To have a right of search, and to lay penalties for all "deceitful wares" (and some that were not deceitful.) In the year 1451 (ayth Henry VI) the company purchased the Cloak Lane Estate, in which their hall was built. In the Great Fire of London, in the year 1666, 54 of the halls belonging to the city companies (including Cutlers' Hall) were destroyed. These halls were shortly afterward restored, and the present Cutlers' Hall, which was also rebuilt at that time, has been in use ever since. It was partly rebuilt in the year 1866. The great antiquity of the guild is undoubted, as, although the first charter was granted in 1417, it is on record that a grant of £4 toward the carrying on of his French wars was made to Edward III in the year 1555.

In the course of an after-dinner weech.

year 1555.

In the course of an after-dinner speech Mr. W. F. Brittain, master cutler of Sheffeld, said that "in the past the English had been particularly desirous to meet foreign."

competition, but he hoped that one result of this exhibition, and of its possible successors, would be an emulation between themselves—a frendly rivalry between Sheffeld and London for the honor of turning out the best cutlery. When this exhibition was first mooted he called a meeting at the Cutlers' Hall, in Sheffield, at which many objections to the scheme were raised by manuwas first mooted he called a meeting at the Cutlers' Hall, in Sheffield, at which many objections to the scheme were raised by manufacturers, on the ground that exhibitions of this class taught foreigners too much, and allowed them to gain information which enabled them to compete with England in the outside world. He succeeded, however, in overcoming these objections, and he was glad to see the admirable appearance which Sheffield goods made in the Exhibition. In Sheffield they had experienced terrible depression in trade, but he personally had endeavored to look at the matter philosophically, and on going into it statistically he found that there had always been periods of depression about every ten years, especially since the beginning of the present century. These periods of depression came on at comparatively regular intervals and were succeeded by times of prosperity. An improvement had already begun in the West, where they generally had the first symptoms of a revival. Sheffield houses were now experiencing a gradually increased demand from America, and many of them were daily receiving telegrams for goods. This was an extremely healthy sign. Mr. Brittain then referred to the subject of reciprocity, expressing the opinion that no system of reciprocity could be thorough or real until there was free trade in every direction. He hoped this Exhibition would be the first of a series which would help to benefit trade and improve the quality of cutlery generally." improve the quality of cutlery generally.

The New Jersey Ship Canal.—The old subject of a ship canal to unite the Passaic and Hackensack rivers with the Hudson, and so effect a saving of 12 miles by water between Newark and New York, is again under discussion. The last Congress ordered and the savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made by the government of a savery to be made and the savery to be made as a savery to be made as a savery to be s under discussion. The last Congress ordered a survey to be made by the government of a route for the proposed ship canal between Newark and New York. Three different routes have been submitted. One is direct from Newark Bay through the Curry property. This would necessitate a cutting through the Bergen Hill rock of 4732 feet, or about seven-eighths of a mile. The hill has an elevation of about 25 feet. The second route takes a diagonal course through the hill, and would save nearly 250 feet of cutting, and the third would follow a straight line from Newark Bay, near the Beacon Light, to a point midway between the two bays where they intersect the Morris Canal, and then follow the line of the canal all the bays where they intersect the Morris Canai, and then follow the line of the canal all the way to New York Bay. No formal expression of opinion has yet been made, but it is believed that the canal is feasible and that believed that fae canal is feasible and that it will be of enormous benefit to Newark, Jersey City and New York. No estimate of the cost has been made, but it will foot up at least \$2,000,000. Gen. Newton will make a report to the government.

Expected Return of the Paris Exhibits.—The United States frigate Constitution, laden with goods from the late Paris Exposition, is now 40 days out from Lisbon, and may arrive at this port at any moment. All the necessary arrangements have been made at the Custom House for the prompt discharge of that portion of her cargo belonging to exhibitors from this city and the Eastern States. As soon as these packages are landed the vessel will at once proceed to Philadelphia, where the balance of her cargo will be discharged. Three days after the geods are delivered on the wharf at the Brooklyn Navy Yard the office of Commissioner-General McCormick, now in room 37 Post Office Building, will be discontinued and removed to Philadelphia, where it will be kept open two weeks. be kept open two weeks.

The Importance of Sanitary Engineering.—Prof. Trowbridge, of the School of Mines, in a recent lecture before the Engineering Society, advised young engineers to give their attention to sanitary engineering, and reminded them that a problem worthy of the closest observation was the excessive cost of railroad transportation.

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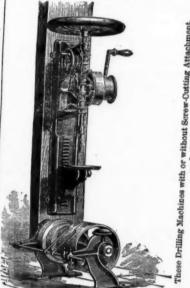
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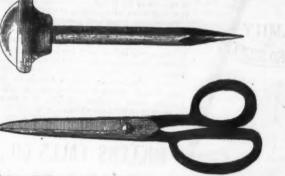
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I	Hinges Lowis, Oliver & Phillips, Pittsburgh, Pa. 6 Scovill Mfg. Co., 419 Broome, N. Y. 35 Stantey Works, New Britain, Conn. 45 Heg Ringers. Chambers, Bering & Quinlan, Decatur, Ill. 27 Hoisting Engines, Makers of, Crane Heos. Mfg. Co., Chicaso, Ill. 9836 Davis A. J. & Co., Newark, N. 37 Hoisting Hachines. Green, Phila. 37 Clem & Morse, 413 Cherry, Philadelphia. 437 Harrington Edwin & Son, Philadelphia, Pa. 37 Hollow Chilled Rolls. Totten & Co., Pittsburgh, Pa. Hooks (Cotton & Haile.) New York Handle & Mallet Works, 456 E. Houston. 13 Horse Clippers. Boker, Hermann & Co., etc & 103 Duane, N. Y. 31	0
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	Shovels, Spades and Sceeps. Hussey, Binns & Co., Pittsburgh, Pa	Tin Wa
l	Philadelphia Smelting Co., 12th and Noble sta.,	Tools, I
١	Hildick A. H., 12 Warren, N. Y	Bruce G
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I	Bauer & Co., 96 Greenwich Ave. N. Y	Gilbert
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l	Randall & Jones, to Oliver, Boston, Mass	Dufur &
l	Smith, Sutton & Co., Pittsburgh, Pa	Oliver E Wire No
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British Iron and Steel Institute.

ANNUAL MEETING.

The annual meeting of the Iron and Steel Institute was held in London on the 7th, 8th and 9th inst., and as it was generally expected at home and abroad that the paper submitted and the discussion would largely turn on the topic of all-absorbing interest the new process for the manufacture of good steel from pig hitherto unsuitable for the purpose, the attendance of English and foreign ironmasters and metallurgists was very large. Mr. Edward Williams delivered his inaugural address, a careful abstract of which will be presented in a future issue of The Iron Age, together with the following papers: "A Supplementary Paper on the Mechanical Properties of Iron and Mild Steel," by Mr. Daniel Adamson; "On the Use of Steel in the Construction of Bridges,' by Mr. H. N. Maynard, C. E., and "The Use of Steel in Naval Construction," by Mr. Nathaniel Barnaby, C. B. We are obliged to postpone their publication for the present, in order to make room for the com-munications on the "basic linings"—the great subject of interest at the present The first of the papers referring to this subject was that by Messrs. Sydney G. Thomas and Percy C. Gilchrist. The greater part of this paper is a reproduction of the one presented to the Institute at the Paris meeting, which was printed in full in The Iron Age of October 24, 1878, and to which, therefore, we must refer, the changes, additions and substitutions being of little present practical value, as the following final portion of their paper supersedes it :

ON THE ELIMINATION OF PHOSPHORUS.

In the nine months that have elapsed since our paper on the "Elimination of Phosphorus," &c., was prepared, the vigorous co-operation of Mr. Windsor Richards and Messrs. Bolckow-Vaughan has enabled the authors to submit to the Institute further evidence in support of the views then put forward. That intensity of temperature is no obstacle to the removal of phos phorus, but, under proper conditions, highly favorable to this end, has been abundantly demonstrated by the results of the working at Middlesborough. It is, indeed, found that, other things being equal, the hotter the blow the better is the result. As regards the necessity for large additions of bases consisting mainly of lime, the experience afforded by some 70 or 80 operations is equally

In continuation of some smaller experiments carried out in 1877 at Blaenavon, trials have been made of the effect of largely increasing the amount of oxide of iron added at the commencement of the blow, and diminishing the lime so as, in a mea sure, to assimilate the cinder to that of a puddling furnace. As was anticipated, it was found that this could not be done successfully. In the first place, the loss from excessive boiling was very great; in the second, the phosphorus is only very imperfectly removed. A very considerable amount of ore may, however, be added after the greater part of the silicon is removed. The amount of bases which it is necessary to add with Cleveland pig gener-ally exceeds considerably two cwt. per ton ally exceeds considerably two cwt. per ton of pig treated, the exact amount being dependent on the wear of the bottom and the percentage of silicon and phosphorus in the pig. The presence of an excess of earthy base in the slag seems an essential condition of success. The formation of a very fluid basic slag at an early stage of the operation is also of great importance, as it enables the phosphorus and carbon to be oxidized part passa, or nearly so. It will be borne in mind that the basic addition has a double function: In the first addition has a double function: In the first place, to preserve the lining; in the second, to form a highly basic earthy slag, so as to afford a strong base with which the phosphoric acid may unite at the moment of its rmation. On several occasions the experiment has been made of blowing in a basic brick lining without, or with very a basic brick hinning without, or what very small, addition. The result is always ex-cessive damage to the lining and a trifling removal of phosphorus. The density and compactness of the present lining material prevents it from playing the important part in the actual formation of the basic slag which was fulfilled by the softer and less durable linings first experimented on. The highly-first magnesian lime bricks have highly-fired magnesian lime bricks have, we venture to think, more than fulfilled all the expectations which were entertained as to their probable value. As, however, Mr. Richards has kindly consented to give you some account of the experience he has had with them, it is unnecessary to dwell on this point.
It has also been ascertained that, provid-

ing a highly earthy basic slag is present, the removal of almost the last traces of phos-phorus may be secured by continuing the blow for some time after the drop of the The phosphorus in the presence of a strong base seems to protect the metal much in the same way as carbon and silicon, so long as there is present an excess of a strong base with which the phosphoric acid can unite at the moment of its formation. When, however, the phosphorus is reduced

very low, the iron begins to oxidize as in an ordinary case of overblow.

The question of the elimination of phosphorus being the primary matter with steel-makers, it is not proposed to do more than to mention that, under the circumstances which have been described as essential to the removal of phosphorus, a considerable which over 80 per cent. of the phospherus and 50 per cent. of the sulphur were removed under very unfavorable conditions, quite confirm the opinion formed from smaller experiments, that the system described is as applicable to the open-hearth as to the Bessemer Furnace. Those open-hearth furnaces which are provided with removable hearths offer peoplier feelilities.

hearth furnaces which are provided with removable hearths, offer peculiar facilities for the adoption of a brick hearth or lining. If the results now brought before you seem to possess any value, that value is largely owing to those to whose discernment and energy it is due that opportunity has been given to develop the system under the most favorable circumstances. To Mr. Windsor Richards especially we are indebted not only for constant counsel and untiring assistance, but for being in a position to lay before you the results of working Cleveland pig on a practical scale.

It is obvious that without a sufficiently durable, as well as refractory, basic lining,

It is obvious that without a sufficiently durable, as well as refractory, basic lining, the simultaneous dephosphorization and conversion of cheap pig in the Bessemer vessel cannot rank as a commercial process. Our early experiments rendered it clear that ordinary non-silicious lime and limestone did not constitute by themselves a satisfactory lining material; nor were renewed trials, made after becoming acquainted with a made after becoming acquainted with a patent dealing with their application, more successful. Magnesia, the use of which as a furnace lining has been suggested by M. Caron and others, is at once very expensive, and, when used by itself, very tender. Nor did we, after repeated attempts, find it at all practicable on the large scale to use oxide of iron linings in any of the forms in which they have been used in puddling furnaces. After a very extended series of trials, it was, however, found that, by firing bricks made of an alumino-silicious limestone at a very intense white heat, a hard and compact basic brick is formed. These bricks, unfortunately, labor under the defect of a liability to disintegration when exposed to the action of steam. By the use of certain aluminous magnesian lumestones and equivalent combinations, and an otherwise similar mode of manufacture, this difficulty has been overcome. For certain purposes, magnesian limestone mixed with silicate of soda solution forms an excellent material. To enter fully into the important subject of the precise conditions necessary for obtain ing a satisfactory basic lining would exceed our limits, and the consideration of this, as of many other interesting points, must be reserved. The question of how far the heat due to the oxidation of phosphorus may re-place that due to the combustion of silicon, phase that due to the compustion of silicon, the possibility of using in the converter low phosphoretic pig low in silicon, and the in fluence of silicon on the removal of phos-phorus, are some of the subjects on which much remains to be said.

much remains to be said.

In advancing the proposition that the technical removal of phosphorus in the Bessemer converter is simply and entirely a question of cheaply producing a highly basic slag, containing under 20 per cent. silica and over 30 per cent. of lime and magnesia, and indicating the means by which this may be secured we are not swear that we may be secured, we are not aware that we ca shelter ourselves under any very distinct authority, though surmises as to the hypo authority, though surmises as to the hypothetical advantages that might be expected were the Bessemer slag less silicious, have not been wanting. It is, however, only proper that we should remind the Institute that Mr. Snelus stated at its March meeting, simultaneously with ourselves, that he had removed phosphorus in a Bessemer converter lined with limestone. Of the circumstances of this experiment we are in incorrect. lined with limestone. Of the circumstances of this experiment we are in ignorance. It is on the production of a basic earthy slag, by the addition of large quantities of calcareous bases, and without excessive waste of lining and metal, and the construction of a durable basic lining, that, we venture to think, the economic solution of the phosphorus problem depends.

It need hardly be said that the theory here.

phorus problem depends.

It need hardly be said that the theory here advanced as to the practicability of commercially removing phosphorus in the convertor extends, mutatis mutandis, to the Siemens and other open-hearth processes, where, in fact, many difficulties that are met with in the converter are absent. Dr. Siemens has indeed suggested the use of a lime lining in one of his furnaces, though he has since, with his customary candor, informed us that he has failed to devise means for its successful application. The present regards phosphorus at the intense temperature which accompanies the Bessemer process.

In concluding, we wish to thank the Blaenavon Company for the great facilities they have afforded for the prosecution of a very protracted series of experiments, the result of a few of which have been laid be-

ANALYSES OF METAL AND SLAG FROM MIDDLES

	Samples after 2 Min'tes' Blow,	Si.		tal.		Slag	
	-14		P.	SI.	SiO ₂	P ₂ O ₁	Fe.
35-	5%	****	***	****			
	171/2	1.49		****	26.6		6.0
	181/2	*****	-43	****	18.6	12.14	6.3
	19%		.08	****	13	11.49	18.0
	20%		•223	****	16.6	13.94	9.45
	Charal		TO.	****		10.66	14.5
	Steel.	****	.05	****	14.6	10.6	17.2
47.	****		1.30		35.8	-52	3
	****	*****	1.00	Trace	32.2	3.35	5.65
	****		-59	****	22.2	XI.64	12.55
	****		.28	****	25.6	8.05	10.75
	Génal	*****	.09	****	18	11.64	17.3
	Steel.		.13		20.4	10.80	9.7
46.	****	*****	1.25				2.4
	****	*****	+34	****		11.04	8.3
	Steel.		.05			11.49	
	Dien.	*****	.053	****	19	12.01	11.3
41.	****		+35	****	13.8	18.34	0.05
	Génal	****	.08	****		15.24	
	Steel.	****	.08	****		13.0	13.75
	****		before Spiegel	****			****
52.		1.68	.17	Acres	26.0	0	
-			.06		10.3	12.78	10.25

Steel. 14 ... 13.6 12.3 14.5 which have been described as essential to the removal of phosphorus, a considerable proportion, viz., from 30 to 70 per cent., of the sulphur is also removed. Certain experiments made by the authors in conjunction with M. Ponsard, in November last, with a Ponsard Furnace, in the first of

	P ₉ O ₀	Metal. P. St. Mn C. SiO, P ₂ O, Fe.	Metal. P. St. Mn C. SiO, P ₂ O, Fe.	Metal. P. St. Mn C. SiO, P ₂ O, Fe. of the control	Metal. P. St. Mn C. SiO, P ₂ O, Fe. of the control	Metal. P. Si. Mn C. SiO, P ₃ O, Fe. C. SiO, P ₃ O, P ₃ O, P ₃ O, P ₃ O, Fe. C. SiO, P ₃ O, P ₃	Metal. P. Si. Mn C. SiO, P ₃ O, Fe. C. SiO, P ₃ O, P ₃ O, P ₃ O, P ₃ O, Fe. C. SiO, P ₃ O, P ₃	Metal. P. Si. Mn C. SiO, P ₃ O, Fe. C. SiO, P ₃ O, P ₃ O, P ₃ O, P ₃ O, Fe. C. SiO, P ₃ O, P ₃	Metal. P. Si. Mn C. SiO ₃ P ₃ O ₆ Fe. CaO Mg ob
	C. SiO, P ₂ O, 13.65 11.79 Oder. 15. 12.9	C. 880 ₃ P ₃ O ₅ Fe.	C. 880 ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.	C. SiO ₃ P ₃ O ₅ Fe.
8.2 P	SiO ₃ P ₃ O ₅ 13.65 11.79 14.65 12.79 15.65 12.79 15. 12. 12. 12. 12. 12. 12. 12. 12. 12. 12	13.65 11.79 16.0 un-13.65 11.79 16.0 un-13.65 15.85	13.65 11.79 16.0 un-13.65 11.79 16.0 un-13.65 15.85	13.65 11.79 16.02 um-13.65 11.79 16.03 15.8 ler. 15. 13.8 10.3 10.3	13.65 11.79 16.02 um-13.65 11.79 16.03 15.8 ler. 15. 13.8 10.3 10.3	SiO ₃ P ₃ O ₅ Fe. 13.65; 11.79; 16.02 un-13.05; 9.68; 15.8 der. 15. 13.8; 10.3	SiO ₃ P ₃ O ₅ Fe. 13.65; 11.79; 16.02 un-13.05; 9.68; 15.8 der. 15. 13.8; 10.3	SiO ₃ P ₃ O ₅ Fe. 13.65; 11.79; 16.02 un-13.05; 9.68; 15.8 der. 15. 13.8; 10.3	SiO ₃ P ₃ O ₅ Fe. 13.65; 11.79; 16.02 un-13.05; 9.68; 15.8 der. 15. 13.8; 10.3
letal.	P ₉ O ₆	P ₉ O ₅ Fe.	P ₉ O ₅ Fe.	P ₃ O ₅ Fe.	P ₃ O ₅ Fe.	P ₃ O ₅ Fe.	P ₃ O ₅ Fe.	P ₃ O ₅ Fe.	P ₃ O ₅ Fe.
Mn C.	P ₉ O ₆	P ₉ O ₅ Fe. P ₉ O ₆ Fe. 9.68 15.8 10.3	P ₉ O ₅ Fe. P ₉ O ₆ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3	P ₂ O ₅ Fe. P ₂ O ₅ Fe. 9.68 15.8 10.3
Mn C.		16.00 Fe.	15.00 Fe.	Fe. 16.09	Fe. 16.09	Fe. 16.01	Fe. 16.01	Fe. 16.01	Fe. 16.01

The second paper read on the "basic-lining" question was the following, by Mr. George J. Snelus: lining"

ON THE REMOVAL OF PHOSPRORUS AND SUL PHUR DURING THE BESSEMER AND SIEMENS-MARTIN PROCESSES OF STEEL MANUFAC-

In speaking of the elimination of phos In speaking of the elimination of phosphorus during the puddling process, Dr. Percy, in his well-known work on iron and steel, suggests that probably the phosphorus is eliminated by a process of liquation of fluid phosphide of iron from the pasty puddled ball. Other writers upon the subject have adduced various causes to account for the remarkable fact that has been so long accounted as an axiom, that whosphorus the remarkable fact that has been so long accepted as an axiom, that phosphorus could be almost perfectly removed by the puddling process, and not at all in the Bessemer converter; but I am not aware of any writer who, up to the time I made my statement at our London meeting last year, had publicly made known that the elimination of the characteristics of the contraction tion of phosphorus in the pneumatic process depended entirely upon the basic nature of

he slag.
I was led to doubt the correctness of Dr. I was led to doubt the correctness of Dr. Percy's hypothesis during my studies of the puddling and refinery processes at Dowlais, and when I came to study the reactions which occurred in the Danks process, the particulars of which were laid before the Institute, I was struck by the fact that a good deal of the phosphorus was eliminated while the iron was in a fluid state. I communicated this observation to Dr. Percy in March, 1872, and at the same time told him. March, 1872, and at the same time told him that I believed I had discovered why this

cocurred.

Early in 1872 I considered how I could obtain invariably a highly basic slag in the Bessemer converter, and I saw clearly that to obtain this result it was absolutely necessary to line the vessel with a basic or neu-tral material, and that no success could be expected so long as it was lined with ganister or any material containing a large pro-portion of silica. I was fortunate enough to make the observation that certain kinds of lime, when submitted to very intense heat, became indurated and converted into a form in which they were no longer acted upon by water. The observation was made while performing the experiment recorded on page 249, vol. 2, of the *Institute Journal* for 1872. I had used a lime crucible for the experi-I had used a lime crucible for the experi-ment, which was to prove the power of free silicon to reduce oxide of iron. The cruci-ble, embedded in lime, was submitted to the most intense heat of the Siemens steel-melt-ing furnace at Dowlais. After the experi-ment I noticed that the lime crucible had has since, with his customary candor, informed us that he has failed to devise means for its successful application. The present paper will have fulfilled its purpose if it induces metallurgists to reconsider the vordict, so fatal to the hopes of steel makers, that "oxygen, whether in its free state or as oxide of iron, is almost entirely inert as regards phosphorus at the intense tempor. high a temperature if it is to be caustic, also occurred to me. This is known to be particularly the case with magnesian limestones Hence I specified magnesian limestone par ticularly. From some experiments I made shortly afterward, I found that it was possi-ble to make bricks out of lime or limestone, provided that when lime was used it was crushed quickly, compressed and fired be-fore it had time to absorb moisture; but it required intense temperature to consolidate them, particularly if the lime was very pure, while a small quantity of oxide of ir other fusible base facilitated this. If was used it was necessary to be well burnt first—otherwise the material was not porous enough to allow the small quantity of carbonic acid to escape without breaking up the brick. Finding, however, that crushed limestone bent itself with considerable facility to such a purpose as lining a converter, being plastic and binding when moist—like clay, in fact—it occurred to me to use it in clay, in fact—it occurred to me to use it in this form, and to fire the vessel at a very high temperature. This was comparatively easy to do in a small converter, but I found considerable difficulty when I came to try a 7-ton converter. There did not appear to be any difficulty in forming a fusible slag in a vessel lined with lime, since this base combines with an excess of oxide of iron to form a fusible former to compare the supplementation. form a fusible ferrate of lime. It was only necessary, if the waste of iron during the blow were insufficient to provide the necessary oxide of iron to form a fusible slag free from silica, to add oxide of iron specially, to which course there could be no objection, while the presence of the oxide of iron would doubtless be advantageous in other ways. At the same time, lime being a basic

body, would not be so readily acted upon by the oxide of iron as a silicious body would

Following up these conclusions, I made several blows in a small (2 cwt.) movable converter soon after I went to the West Cumberland works. The results of these experiments I have shown to many private friends, and I have now the pleasure to lay friends, and I have now the pleasure to lay the details before the Iron and Steel Instithe details before the Iron and Steel Insti-tute. The results with the small vessel were very satisfactory, as will be seen by refer-ence to the analyses, and there can be no doubt as to the perfect elimination of phos-phorus and sulphur when the slag is kept thoroughly basic. In order that there might be no doubt on the subject, I lined the same small vessel with ganister in the usual way, when I found that the phosphorus refused to leave the metal, just as in the ordinary converter. I therefore patented the use of lime and limestone, magnesian or otherwise, in all the various forms in which it occurred to me that it was possible to use it, for "the to me that it was possible to use it, for "the lining of all furnaces in which metals or oxides are melted or operated upon while fluid;" and I especially called attention to its use in the Bessemer converter, giving some details of the results of its use under these circumstances. I was perfectly well aware that limestone had been used years ago for lining the sides of pudused years ago for lining the sides of puddling furnaces, but its use for this purpose was a very different thing, because the metal in the puddling furnace does not remain fluid at the end of the operation, for which reason it did not answer satisfactorily, and, as is well known, its use for this pur-

pose is almost entirely discarded.

In the first blow the converter was lined with ground limestone in a plastic state, and fired at as high a temperature as possible for a considerable time. A small cupola was also lined in the same way. About 2 cwt. of Middlesborough pig iron, in which the phosphorus was about 1½ per cent., was melted in the cupola, then run into the con-verter and blown in the usual way. The metal blew well, and some spiegel was added at the end of the blow, which accounts for the rather high carbon in the steel. On analysis the resulting steel was found to

COMMUNICATION						
Iron, per Carbon	cent					98.84
Carbon					******	
SHICOH						TL SPC
Sulphur.						trac
Sulphur. Phosphor	us					.01
While Silica (ove Lime Phosphor	the sl	ag co	ntaine	d:		
Silica (ove	er)		*****		******	6.
Lime					not esti	mate
Phosphor	ic acid.	per	cent			3.

In order to try whether sulphur could be removed at the same time, a second blow was made in the same apparatus, a quantity of melted mottled hematite being run into the converter, and lumps of gray Cleveland pig were thrown in with it to afford ad-ditional silicon. In order to trace the reditional silicon. In order to trace the reactions which took place, samples of metal
and slag were taken from the converter
during the blow and submitted to careful
analysis. The metal was scarcely fully
blown, as will be seen from the final sample.
Those taken during the blow yielded the
following results:

		o manageac.	are messagnam.	34 peerrapae.
ı	Iron	****	98.29	****
	Carbon	3.0	1.25	.66
	Silicon		. 11	.042
	Sulphur	.346	.274	. 169
	Phosphorus	.864	.314	.231
	CORI	RESPONDIN	G SLAGS.	
	Fe ² O ³	12.1	****	7.1
	FeO	23.8	41.9	39.2
١	Silica	44.8	25.0	19.2
ı	Lime	14.8		24.0
ı	Phosphoric acid.	2.3	7.25	7.0
1	Sulphur	.3	-352	. 512
ı				

It will be noticed that the silica in the slag is rather high in this case, and that the imperfectly blown sample No. 3 has not quite lost all its phosphorus and sulphur. The gradual diminution of these elements, however, is very conspicuous, and no doubt the fully-blown sample would have been however, is very conspicuous, and no doubt the fully-blown sample would have been sufficiently pure for ordinary purposes. The third blow was made from a mixture that was tolerably free from phosphorus and sulphur to begin with, in order to see whether it was possible to remove the last traces of these elements. This was a very perfect blow, lasting just fifteen minutes, and the exact times at which the samples were taken were noted. Further, in order to test the steel, some of the fully-blown metal was melted in a crucible with 6 per

cent. spiegel, and tested in various ways.

Third Blow.—About 100 lbs. No. 2 Bessemer pig and 30 lbs. gray Cleveland were melted together, and then blown in the same

The results were: METALS.

	I. After 2 min- utes.	2. After 5 to 6 minutes.	3. After 10 to 12 minutes.	4. At end of blow, 15 minutes.	After melting with 6 \$ Spiegel in crucible.
Iron	1.505 .109 .327	1	partly slag	tr'ce .019 .030	98.44 1.30 trace .052* .052*
	COR	RESP	ONDING SLAGS.		
Fe ₂ O ₃ FeO Silica Lime			53.8 10.2 33.0	11.42 49.00 10.50 25.0	::::

* The increase in these elements was due to the piezel added.

2.88

spiegel added.

The full-blown metal was fluid, and set moderately sound. It forged and rolled well, and could be easily welded. It stood hot and cold tests well.

A larger vessel was then prepared, and about one ton of highly manganiferous pig blown in it, containing about 0.3 per cent. phosphorus. And the blown metal contained:

restricti	-																									
Carbon. Phospho			•										*			è								**	4	
Phospho	orus																		٠			*	2.5	.5	000)
And	the	sla	g	C	0	n	te	a.	ir	16	30	ŀ														
Iron												0 1				 			 				30	5.7	7	
Silica					4.1								٠,					*					IS	1.5	5.5	
Lime																 						 	28	3.2	1	
Phospho	rus.														0	 						 		. 5	ZQ	ŀ
The	223.01	la	-	4.	4	13	10	ď.	-	. 2		ı	٠.	^	e	61	4	ŧ.	1	W	L	 		487	00	

lining had not been sufficiently heated, and the metal blew so cold that it could not be poured. As the vessel could not be spared for another blow, the experiments were supended at this point. It appeared that the only serious difficulty was in getting the lining of the vessel, when put in in the ordinary way, thoroughly burnt, and it occurred to me that a way out of the difficulty might be found in making bricks out of the material and burning them beforehand, but I did not go beyond satisfying myself that this was a perfectly feasible plan, and having to devote all my energies at this time to reorganizing the West Cumberland Works, further tests were put off. Although no experiments were made in a Siemens furnace, all chemists will agree that the reactions occurring in the Bessemer converter could be more easily obtained in the open-hearth furnace. lining had not been sufficiently heated, and

Some time afterward Dr. Siemens was good enough to have his experimental rota-tor at Birmingham lined with limestone in a similar way, but it did not answer for two similar way, but it the into answer for two reasons, in my opinion: 1. The limestone was a peculiarly rich one, and would not bind well after burning. 2. The tempera-ture that could be obtained in the rotator was not sufficiently high.

It is essential that the material used for

lining the vessel, and for bottoms, should be as free from silica as possible, as some of this must go into the slag, and it appears to be necessary to have a large amount of base to saturate the silicic and amount of base to saturate the silicic and phosphoric acids present in the lining material or bases added to form slag, or formed from the oxidation of the silicon and phosphorus in the iron. Unless this is done, the slag becomes too acid to allow the phosphorus to be eliminated. This is seen to some extent in Blow No. 2. It is a question how much base is required, but I am inclined to believe that there must be sufficient to form the basic silicate and tribasic phosphate.

In conclusion, I have the pleasure to place before the meeting what I believe to be the first sample of Bessemer steel made entirely from Cleveland iron by one operation, in which the phosphorus has been reduced to a

which the phosphorus has been reduced to a which the phosphorus has been reduced to a mere trace. A portion has been forged into a chisel, while a rough specimen of the same has still part of the lime lining attached to it. With the samples I have placed the original wrapper bearing the date when the sample was made, and also my note-book with the original entries of the details of the analysis

Progress in the Central American Republics.

We have had the pleasure of an interview with Mr. Biaz, Consul-General for the Re-publics of Honduras, Guatemalaand Salva-dor, who has just returned to his post after an absence of more than three months, taking notes of events in his own country, the progress of public works, &c. In several instances he is charged with the execution of important contracts.

especting Guatemala, he informs us that Respecting Guatemala, he informs us that the railway from the port of San José to the city of Escuintla, half way to the capital, is a work regarded with special interest. All the engines, rails and other equipments are forwarded from the United States. A considerable portion of the materials, such as railroad ties and constructions. terials, such as railroad ties and construc-tion implements, have been sent from San Francisco; the rails, from New York. On a line of road extending 28 miles from the sea, the government guarantees a net profit of 12 per cent. per annum and loans \$210,-coo toward construction. Eventually the road will be pushed forward to the city of Guatemala, 60 miles inland.

Another work of improvement is the con-

Another work of improvement is the construction of a steel-wire bridge of 220 feet span across one of the navigable rivers, for which Roebling, of this city, furnishes the materials, to be forwarded next month. The city of Guatemala is to be lighted with the "boulevard lamp," also from New York, and lines of telegraph are extending through the country in every direction. Mail communication being by means of mules and the diligence, the telegraph is a popular institution. It may also be mentioned that Mr. Biaz is sending out a large printing press for government purposes. The country is peaceful and prosperous. Business is reviving. As a rule, American manufactures are preferred to any other, displacing the European. As remarked by Mr. Biaz, "the people are finding out the merit of American goods and give them the prefer-American goods and give them the preference." The specialties in request are drygoods, agricultural implements and house hardware. The merchant classes are in good credit, and business with the United States is increasing. In Salvador trade is

Honduras, under the administration of Honduras, under the administration of Marco Aurelio Soto, is making vast strides in improvement, establishing schools, building telegraphs, new cartroads, &c. A telegraph line is in progress from the port of Trujello, on the east coast, to the capital, a distance of 350 miles. The wire and other materials have already been sent out from the United have already been sent out from the United States. When this is completed, Hondurus will be within three days of New York via the Havana cable. The government mint sent out last fall is in successful operation.

From Costa Rica the intelligence received indicates great activity in railway construction. Of the line from Port Lemon to San José, 120 miles are already built, and it is now proposed to commence on the Pacific

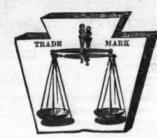
José, 120 miles are already built, and it is now proposed to commence on the Pacific terminus, at Punta Arenas, and lay down 58 miles in addition. Contracts are about being made in New York for the necessary rails, locomotives and cars, tools for construction, &c. As the Pacific Mail steamships touch at Punta Arenas eight times a month, this railway line will form a new route across the Continent, shortening the distance, 750 miles compared with the distance 750 miles compared with the Isthmus of Panama. The length of the road from ocean to ocean will be 270 miles.

The Detroit Post savs that the Wyandotte The metal at the end of this blow was perfectly fluid, and the lining of the vessel remarkably good. The arrangements for tilting this vessel were imperfect, and the metal had to be allowed to set in the vessel.

Lastly, a charge of 4 tons of metal was blown in a large 7-ton converter, but the cargo of ore arrives,

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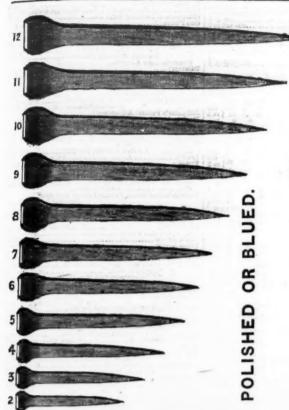
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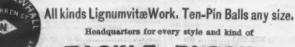


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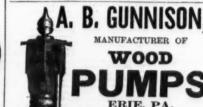
WORKS & FURNACES Bergen Port, N. J. and Manufacturers of

PURE LEHICH

From Lehigh Ore.
Warranted free from any trace of Lead, an pecially adapted for

Cartridge Metal and German Silver. BERGEN PORT OXIDE ZINC Superior for Liquid Paint on account of its bod and wearing properties.

F. OSCOOD & CO., Proprietors. E. A. FISHER, Agent, 13 Burling Slip, N. Y.



ERIE, PA. ESTABLISHED, . **Warranted Genuine** Cucumber Pumps & Pipe. Also Popla Pumps, Lined Pumps, &c.

The Trade Supplied by
H. B. GRIFFING,
60 Cordandt St., N. Y.
P. MANN, Washington, D. C.
SCOBIE, HARRISON & PAR
KER, 125 Liberty Street, Pittsburgh, Pa. SCOBIE, HAberty Street, Exercise Street,

A. B. GUNNISON Manufacturer, ERIE, PA.

Valves. FIRE HYDRANTS.

Yard Hydrants.

Street Washers. DODGE HAY PRESS.

"DRAW-UP" PRESSES,

LARD & TALLOW PRESSES.

Machinery,

IRON AND BRASS CASTINGS. Pulleys and Shafting

New York Wholesale Prices, May 21, 1879.

HARDWARE.	5000
A DVIIA.	
Ch Eagle Anvils (American)	20
Trenton.	. 20
A Tarila Anviis (American). W B oc dis Wrishe's Monse Hole W B role over 250 Bs I Armitage's Monse Hole 9% G Trenton. Conn Vallen His. Co. Humphrevaville His. Co. Baecher (French, Swift & Co). 10 \$ 50 \$ C-iswold. Nobles Mig. Co. Caswold Cook's, Douglass Mig. Co. dis 50 \$ Cook's, Douglass Mig. Co. Cook's, Douglass Mig. Co. dis 50 \$ Cook's, Douglass Mig. Co. dis 50 \$ Cook's. Baecher (French, Swift & Co). 50 \$ Cook's. Cook's, Douglass Mig. Co. dis 50 \$ Cook's. Baecher dis 50 \$ Cook's. Bachine dis 50 \$ Cook's.	
Beecher (French, Swift & Co)	şc i
Nobles Mfg. Co	
Cook's, Douglass Mfg. Codis soll ('ook's, Ives'	10
B. Machinedis sok	10
Patent Solid Headdis: Russell Jennings Auger, Dowel, Machinedis:	35
Dowel and Hand-Rail Bits	10 5
C. S. Bits dis dis Comins's Bits dis dis Patent Solid Head dis loss dis Russell Jennings' Auger, Dowel, Machine-Dowel and Hand-Rall Bits dis loss distribuistados distribu	10 9
Ives" "Jennings" Bits	10
Andrews Bits. dis Griswold's Patent Bits. dis Expansive Bits. Clark's. small. \$18: large. \$26 dis	30
" Ives	3 5
Eollow Augers Ives French Swift & Co	10 5
"Bonne's Adjust \$\pi\$ dos \$\frac{2}{4}\$-dis \$\frac{1}{4}\$." Bonne's Adjust \$\pi\$ dos \$\frac{2}{4}\$-dis \$\frac{1}{4}\$." Stearns' Adjust \$\pi\$ dos \$\frac{2}{4}\$-dis \$\frac{1}{4}\$." "Stearns' Adjust \$\pi\$ dos \$\frac{2}{4}\$-dis \$\frac{1}{4}\$." "Ives' Expansive each \$\frac{2}{4}\$. \$\pi\$-dis \$\frac{1}{4}\$." "Unival Expansive \$\pi\$, o \$\pi\$ gross, dis \$\pi\$. Biamond \$\pi\$ dos \$\pi\$. od \$\pi\$ sock in \$\pi\$. "Bee". Double Cut Gimber. Pits Shepardaon's \$\pi\$.	109
Stearns' Adjust., © dos \$48—dis 25&1	0 9
Gimlet Bits	0 %
" Ct. Valley Mfg. Co., dia softs	~ 6
Hartwell'sdis of Douglass'dis 4	0%
Morse's Bit Stock Drill, List of May 15, 78dis 50E1 L'Hc:nmedieu's Ship Augers	244
Watrous Ship Augersdis :	5%
Hartwell's dis 6	0%
Peg, Plain Top\$1.40 \(\pi\) doz—dis n	2%
Awis, Brad Sets, &c. Awis Sewing, Common	5 %
" Sewing, Best. " gross 1.40—dis 10 Shouldered Peg. " gross 2.25—dis 10 Patent Peg. " gross 60—dis 10	MMM
" Shouldered Brad Fgross \$2.70—dis 25&10" Handled Brad \$7.00 Fgross—dis 25&10	18.5
Peg, Flain Top	et
No. 42, \$10.50; No. 43, \$12.50dis to & 10 " Stanley's Excelsior, No. 1, \$9.60dis 2<&10	XX
No. 2, 4.80dis 25&10 No. 3, 7.80dis 25&10 No. 3, 7.80dis 25&10 Light. Med. Heavy	0%
M. H. Jones & Co\$3.00 \$8.00 \$0.00 \$\text{\$0} \text{ doz ne}	it.
Solid Collar, Case Hardened, Chilled Box 30 15.	BC BC
Palances.	-
Hand, Light Brassdis. 75 @ 75&5	7
Heilis dis 25.200 Heilis Hand, Light Brass dis 7.527 Extra Heavy dis 10 White Metal dis 70 Silver Chime dis 25.210	*
" Swiss	XXX
	8
" Brook's dis 50	%
Cone's dis 10 Cone's dis ook 10 Lever, Sargent's new list Dec. '78 dis ook 10 Taylor's Bronse or Piated Lever dis 25& 10 Hart, Bliven & Mead Mfg. Co. dis ook 10 Hart, Bliven & Mead Mfg. Co. dis ook 10 Pull, Hrook's dis 50 dis 50 dis 50 dis 50	4
" Japanned Leverdis 25% 10 " Hart, Bliven & Mead Mfg. Codis 50% 10% 2	*
" Western dis 25&10	* * *
Call	N. N.
Western dis 20% 10 "Sargent's new list dis 20% 10 "Kentucky "Star" dis 20% 10	3
Dodge's Genuine Kentucky new list	ŝ
ECA-60	2 2
Wilson's Moore's dis to	2 2
Hand Bellows	×
Belting, Rubber. N. Y. Beiting and Facking Conew list ne	3
N. Y. Boiting and Packing Co	6
Diagonal	6
Van Sand's	
Washourd's Fatest \$24.00, dis 40 9 Merriman's	
Blind Staples. Boardman's Patent, Min. and larger # \$150 net	
Blocks.—Burr & Co	
Penneid Block Works, Rope and Iron Strap'd. dis 40 %	1
Cast Iron Barrel, Shutter, &c	
Square dis costrol Shutter (Stanley's list) dis costrol (Sargent's list) dis costrol (Sargent's list)	
Sunk Flush, Sargent's dis 66%&to 2	
Square dis cokros Shutter (Stanley's list). dis cokros Shutter (Stanley's list). dis cokros Stanley's. dis cokros Stanley's. dis cokros B.K. Flush, Com', Stanley's. dis cokros R.K. Flush, Com', Stanley's. dis cokros Stanley's dis cokros B.K. Flush, Com', Stanley's. dis cokros Stanley's dis cokros	
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Philadelphiadis foakto @ foakto @	
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######################################	1
Bring C. & S. W. Co.	1
Bright Wire Goods	1.
Rotchkiss'	1
Wrought Brassdis 60 \$	8
Wrough Brass dis 600 to 5 COMMON CAST, NOT DRILLED Fast Joint, Narrow dis 600 to 5 COMMON CAST, NOT DRILLED Fast Joint, Narrow dis 600 to 5	1
Fast Joint, Narrow dis 60&10 % Broad dis 60&10 % Graph County and Broad dis 60&10 % Graph County and Broad dis 200 % Graph County March County	MONMEDIA
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Fast Joint, Narrow dis 55&10 % Broad dis 60&10 % Louse Joint dis 25 % Appaned dis 25 %	
Parliament Butts	CHN
Loose Pin no Acorn	SHAP O
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Union Mfg. Co.'s Fancy Hutts- "Fured Knameled Loose Joint	B
" with Iron Acornsdis 75&10 \$	8

	New York W	
	Fast Joint Narrow	
-	VROUGHT IRON. Lt. Narrow Lt. Narrow Hroad. Lecae Joint, Broad Table Butts, Back Flaps, &c. Inside Blind, Regular Light Loose Pin, Wrt.	
	Loose Pin. Wrt. Spring Hinges: American Spiral Spring Butt Co., Jap'd dis Fancy dis Geer's Single and Double Acting dis Sabin Mfg. Co.'s Double Acting dis	25 9 25 9 35 9
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-	American Spiras piring batting in the Sapin Mrg. Co.'s Double Acting dis Sabin Mrg. Co.'s Double Acting dis Centennial, Japanned dis Centennial, Japanned dis American Spring Hinge Co.'s. dis American Spring Hinge Co.'s. dis Junion Mrg. Co. dis Dommer's. dis Junion Mrg. Co. dis Bommer's. dis Junion Mrg. Co. dis Sind Butts. Parker. dis jok. Bind Butts. Parker. dis jok. "Falmer. dis sokrostrok Seymour. dis 66% Co. Lo. dis Junio American dis jok. "In Junio Porter dis 66% Co. Lo. dis Junio American dis jok. "Micholson dis jok." Micholson dis jok. "Micholson dis jok. "Burglo "Noiseless" dis jok. "Sargent's. dis jok. "Sargent's. dis jok. "Burglo" Noiseless" dis jok.	0%
	" Sargent's	0 KKV
-	Butchere' Cleavers. Rumaion & Beckley Mfg. &o. dis 2 Beakly's. dis 2 Beakly's. dis 2 \$1.5.50 15.00 21.50 24.00 27.00 30.00 32.50 35.50 Hart Mfg. Co. dis 2 \$2.00 30.00 20.50 35.00 37.00 41.00 45.00 Can Openers.	2 %
	#30.00 35.00 20.50 33.00 37.00 4140 45.00 Can Openers. Messenger's Comet. **Messenger's	M M M M
	Lyman's. Quos 25,75, dis 49,76, dis 79,000 Poole. \$\frac{\pi}{2}\$ \$\frac{\pi}{	o K
	Caps—Percussion, 10 1000. Hicks & Goldmark's G. D. & S. R.	IN S MI
	Star	MAMMA
	Ely's E. B. 1-103, 05 66 0d Double Waterproof, 1-48, \$1.50; 1-168, \$1.50; 1-168, \$1.50; 1-168, \$1.50; 1-108, 80; Colt's 1-108, 80; Cartridges.—Metallic dis 60&7 Cards.—Horse and Curry dis 335/gku dis 50&7; Cards.—Unranded to the color of t	80 80 80 80 80 80
	Coston. dis 24210 Wool. dis 25210 Car Pusher,—"Giant"\$6.24 each, dis 20 Carpet Stretchers.	WWW .
	Carpet Stretchers. Q dos \$5.00, dis 30 Cast Steel, Polished. ♣ dos \$5.00, dis 30 Iron Steel Points. ♣ doz \$5.00, dis 33 Casters. Bed. dis 55 Bed. dis 55 Plate and Shallow Socket dis 55 Deep Socket dis 55 dis 40 dis 55	- 1
1	Cattle Leaders. Humason. Beckley & Co.'s (low list)	MM
-	Sargent's dis 70&10 Chain. Trace, 06-1-2. by the cask, \$\bar{v}\$ pair 45 @ 46 06-10-3. by the cask, \$\bar{v}\$ pair 45 @ 46 06-10-3. by the cask, \$\bar{v}\$ pair 33 @ 44 07-10-2. by the cask, \$\bar{v}\$ pair 33 @ 44 07-10-2. dis 40&10	0000
	Oneida Halter Chain	****
1	White	2
-	Chiseis. Socket Framing, Crossman	200
	Douglass dis 70	20000
1	White Crayons.	2000
0	"Buck Bros (Shank)	
	Clamps, rou, Providence Tool Co.'s, Wrt. Iron dia 25 rou, Providence Tool Co.'s, Wrt. Iron dia 25 "Adjustable, Gray's dis 20 "Adjustable, Gray's dis 20 "Adjustable, Gray's dis 20 "Snow's dis 20 "Snow's dis 20 "Snow's dis 20 "Snow's dis 20 "Gray and State dis 20 "Cabinet, Sargent's dis 30 "Carriage Magent dis 20 "Cord and Tape (1. & S. Mfg. Co.). dis 20 "Clips, Axie.	
1.00	"Cord and Tape (T. & S. Mfg. Co.)	2
H. F.	Cocks, Prass. 1% inch, 33c.; 1% inch, 33c	92 144
A SIE	le and Beer, new list. dis 50 % Coffee Mills. cord and Box	1
1	merican (Enterprise Mig. Co.)	N
1	Combined Dinner Pall and Lantern. er dos \$11.00.	7
,	Dampasses	BBJ
		BPSFLS
N N	orn Kalves and Cutters,—Bradley'sdis to & Crow Bars. ast Steel	HAH
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Little	inching Irons. \$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	P
Line	nite Ename dis 15 Cutlery net Cutlery Co. (Table). net Miller Bro.'s Cutlery Co. dis 24 umason & Beckley, Pocket. dis 335 augatuck Cutlery Co. list net augatuck Cutlery Co. dis 36 augatuck Cutlery Co. dis 37 aug	BINCOS
THE PERSON	augatuck Cutlery Co	St Ci
Ore	aron Burkinshaw's Pocket. dis 35 \$ Dogr Cellars. nbossed Gilt. dis 20 \$ ass. dis 25 \$	H A Se N
64770	m (Coll)— No. 1, Large, Japanned	Is
r	Japanned. \$\psi\$ dos \$2.00 2.50 3.50 \\ Coppered. \$\psi\$ dos 4.00 4.50 5.00 \\ Galvanized. \$\psi\$ doz 3.50 4.00 4.50 \\ Nickeled. \$\psi\$ doz 5.50 0.00 7.00 \\ Nos. 1 2 3	H
JA LI WAY	nymaned	SI
al al al	0. v, sectium. \$ doz 2.50 (dis 30 %) 0. 7. Lakye. \$ dos 3.50 bin's Lever. No. 1, \$1; 2, \$1.50; 3, \$2; 4, \$2.50; dis 35 % bin's Boss, No. 1, \$4.40; 2, \$4.50; 3, \$3.00. dis 50 % bin's Crown. \$4.50; \$4.50; \$6.50; \$6.50.	Co
d Mount	e Rod	M.
el di	die 78. dis 35 % justable Handiedis 20 % therby Tool Co.	î
	therpy Tool Co	"L W

	luicsaic i i	100
1	Breast, Wilson's. " Miller's Faliseac Ratchet, Merrill'seac	h \$2,50 dis 25 dis 25
0 %	ingerson's (old list)	dis 35 dis 30 dis 20
5 %	Whitney's Hand Drill. Wilson's Drill Stocks	dis 2000 10 dis 10 h \$2.75, dis 30 it dis 30
5%%%	Danbury Egg Heaters. Power. Family National. P doz	85.00, dis 30
RMMAN		84.50, dis 331/3; c's Improved
***	Elevator Buckets. Mill E. Buckets, light, 3½ to 10 in., (Du % 100 \$15. Mill E. Buckets, heavy, 5 to 10 inches (Du % 40 \$8. Storehouse, (Duc's Patent) 12 to 17, \$12.00	ic's improved to @ \$10.20, ne @ \$20.00ne
NYME	Genuine Chester—Regular Nos	
** *	Wellington Mills, Grain. Flour. Hampden Emery Grain.	₩ B roc ne ₩ B soc ne
NW D	B. & A. Emery Paper. Enameicd and Tinned Ware. Kettles.	dis 45 5
	Tinned Sauce Pans. Escutcheon Pins. Iron. Brass.	dis 35 5
MMMM	Storehouse, (Duc's Patent) 12 to 17, \$15.00 Emery and Emery Faper. Genuine Chester-Regular Nos. "Flour and FF. "In to-lb. caps. Washington Mills—Regular Nos. "Flour. Wellington Mills—Regular Nos. "Flour. Wellington Mills—Regular Nos. Flour. Hampden Emery Grain. B. & A. Emery Paten. Esameled and Tinned Ware. Kettles. Sauce Pans. Tinned Sauce Pans. Escutcheon Fins. Fron. Brass. Becutcheons. Door Lock. Same discounts a Brass Thread. Wood. Figureris.	ns Door Locks dis 60&10 9 dis 25 9
K to K K	Fenn's Cork Stops	dis 40 %
NA SEAS	Frary's Patent Petroleum. Wood and Metallic. West's Patent Key. Metallic Key, Leatner Lined Cork Lined Entorprise (Self Measuring) \$\psi\$ dos, Fellos Plates \$\psi\$	dis 40 %
XXXX	Enterprise (Seif Measuring)	\$96.00, dis 20 % 150, dis 50 % 0 to £. dis 35 %
0000	Files	to £, dis 35 % to £, dis 35 % dis 25 % List) dis 35 %
0000	Madden & Cockayne File Co	to £, dis 25 5 4.50 to £ 8 7.50 to £
2	Walter Spencer & Co,'s "Diamond" Fisher's	4.50 to £
	Butcher's. Walter Spencer & Co.'s "Diamond". Fisher's. Moss & Gamble. H. Diaston & Sons (new list). Western (new list). Limet & Co. (French). Fishing Machines. Knox, 4 inch Rolls. ** **Billing Machines. **Erreka. **No. 1, 7-inch Roll. **Billing Machines. **Erreka. **No. 1, 7-inch Roll. **Erreka. **No. 1, 7-inch Roll. **Sons ** **Sons **Arreka. **Sons **Son	\$4.25 to £ 12.50 each net
4	Peerless, 4-inch Rolls	4.00 each net 4.00 each net 4.75 each net
	Eureka. No. 1, 7-inch Roll	12 % each net ch, dis 33 % % ch, dis 33 % % 5.00 each net
	Star	4.00 each net 2.50 each net 1.50 each net 2 \$15, dis 20 \$
	Clark's Hand Fluter	\$15, dis 10 % los \$12.00 net 15.00, dis 20 %
1	Buffalo	10.00, dis 10 % dis 45&10 % list, dis 15 %
1	" Reed & Barton	dis 40%5 %
1	Fry Paus. Burnished. list as follows	dis 60& 10 %
1	Chuges. Marking, Stanley's. Chapin's. Star. Wire. Smith's Patent. \$\psi\$ doz \$i\$	dis 50&10 \$dis 50&10 \$dis 50&10 \$
1	Vire	dis 10 %
I	Eureka Gimlets	dis 10 %
7	Smith's Patent. \$\psi\$ dos \$i\$ Glimlets. Sail and Spike. Bee "Glimlets. Fee "Glimlets. Diamond "Glimlets. Double Cut, Sheparason's. " "Ives". " "Ves". Glue Pots. Glune County Co	dia 55 %
	Glue Pots. inned and Etameled amily, Howe's "Eureka" L. F. & C.'s "Handy" Grindstone Fixtures. argent's Patent eading Hardware Co	40 %
B	leading Hardware Co. "Keystone"dis ammers. "Keystone"dis Anydole's, New List of Dec. 10th, 1878 heney's, List January, '79.	is 40&10&2 \$ 14&5&10&2 \$ dis 15 \$
CHVM	heney's, List January, '79. . Hammonds. erres. 	dis 25 % dis 20 % dis 5 % s.dis 25&10 %
P	. manmouse lignetic Tack, Nos. 1, 2, 3, \$1,25, 1.50 and 1.7 former & Soble's. The Soble's. Hand Cuffs and J.eg Frons- rovidence Tool Co. 8 fand Cuffs, \$15.00 \$1 U.Eg Irons, \$25.00 \$2 ower's.	dis 25 %
T	** Leg Irons, \$27, \$2 doz **Ower's **Handles.—Door or Thumb Latches— **Nos **1 2 3 4 **Per doz **Leg Irons, \$27, \$2 doz **In and Irons, \$27,	dis rokto s
RBJ	oggin's Larches	so @ 33C net so @ soc net e \$0.80
SEL	rought Chest urface Chest, Sargent's list	dis 70 % dis 75&10 % dis 76&10 %
出土土田	iw and Plane ammer and Hatchet	dis 40&10 \$uis 20 \$ dis 25&10 \$
A:	pple " assorted, " 5. cket " large, " 5. sworted, " 5. executed " assorted, " 5.	00 dis
Fi A	ower's Handles.—Door or Thumb Latches— Nos	75 00 00 dis 25&10 %
Ba	Bwan's	dis 20tto \$
CCSC	Bwan's. F set \$1, Hangers. In Door. dis ovelty nallenge imax i Anti-Friction. ering improved (Anti-Friction). eritree Harness Snaps.	dis 50 % 1 dis 50 % 1 dis 75&10 % 1 dis 20 %
He	enshaw'sList of 134 changed to \$14.00, idd's14.00.	dis 55 % dis 60 % dis 55 %
At Sa Ne	ndrews'di	dis 10 %dis 40 % ls 66%&10 % dis 20&20 %dis 70 %
Isi	sian Blood	
H	Int's	100 \$8.75 50 9.25 E
HU	Shingling, Nos. 1 2 3	35 9.00 dis 45 % V 50 89.00
I	mmon ** Shingling, Nos. 0 1 2 3 \$\psi\$ doz \$7.50 \$2.00 \$2 Claw, Nos. 1 2 3 \$\psi\$ doz \$0.00 \$2 athing. Nos. 1 2 3 \$\psi\$ doz \$0.00	35 89.00 A
Co	llins	dis 10 % A
M.	athing, Nos. 123	50 7.00 Si dis 45 % 50 \$9.00 C
		50 10.00 H 50 9.00 L 00 14.50 W
15	lay Knives.	- 6

10		
20 %	Gate, Clark's No	III III
35 % 30 % 30 %	" Shepard's	54
10%	Rolled Blind Hingos dis box rox Rolled Raised dis 6ox Plate Hingos 6 to 10 in 40 dis 6ox Sorew Hook and Strap 14 to 6 in 90x Heavy Welded Hook 6 to 12 in 10 dis 5ox Screw Hook and Eye 6 to 12 in 10 dis 5ox S	E C
10 % 10 %	"Providence" over 10 in. 40 W h Screw Hook and Strap 5, 10, 12 in., 110 dis 50&: 14to 30 in., 9\(\) 6 to 12 in., 11 0 dis 50&:	00
net is %	14 in. & up. 9/46 1/2	39
ed) ed) et	Hees Solid Shank, C. S	19
60	Grubdis 30 @ 3	jo js
8c sc et	Scovill Pattern. dis 2s, 6s 2s	505
net net net	Heeks. Bird Cage, Sargent's listdis 70&10@70&10&1	00
5%	Cotton (Himmason & Beckley Mfg. Co.)	005
200	"Skinner's, 86.25 per doz. dis 20 Clothes Line, Hart's list. dis fockrocker "Sargent's list. dis 70 krokrok	0000
Ks Ks	"Reading list. dis coëroce. Hart's list. dis 70&10 Hartess. Hart's list. dis 70&10 Cont and Hat, Hart's list. dis 60&10&10 Reading list. dis 60&10&10 Bargent's list. dis 60&10&10 Reading list. dis 60&10&10 Tassel T. & S. Mig. Co. list. dis 90&10&10&10 Tassel T. & S. Mig. Co. dis 4 We repert's the season of the list of 10 × 10 × 10 × 10 × 10 × 10 × 10 × 10	000
K M M M	Coat and Hat, Hart's list	000
* * * *	Wrought Staples, and Hooks and Staples, dis 75&10@ 6 "Staples, Stanley's list. dis 40 Wire Screw Hooks and Eyes. dis 70&10	000
N.M. W	Tassel (T. & S. Mfg. Co's list. dis 2 Tassel (T. & S. Mfg. Co.). dis 4 Wrought Staples and Hooks and Staples, dis 7,8:10-6 Staples, Staples stales and Eyes. dis 7,8:10-6 Wire Screw Hooks and Eyes. dis 7,8:10-6 Whiffietree—Patent dis 4,0-6 Hooks and Eyes—Malleable Iron. dis 7,0-8:10-7 Horse Hay Forks.	2
N. M. M. N.	Horse Nails Nos. 5 0 7 8 9 10)
SEA WA	" Finished,	
2000	A C Blued " 310 280 260 240 240 230 A C 60 50 40 26 24 22 21 20 19 18 18 180 10 Nos 1 2 3 4 5 6 7 8 9 10 11 12 11 Bridgewater Iron Co. Nos. 5 6 7 8 9 10 11 12 11 Bridgewater Iron Co. Nos. 5 6 7 8 9 14 Polnied and Polished 260 230 240 200 390 180	
222	Cortland P't'd & Blued., 200 230 210 200 190 100	
36	Globe (New list). 1 26 23 21 20 19 180 In H. P. Pointed and 26 23 21 20 19 18 20 H. Pinished. North Western Finith 26 23 21 20 19 180 In National. Pointed and	200
et et	National Founted and Polished, Pat. Fin 25 23 22 27 200 m. Putnam Hammer, Pt'd 26 23 21 20 19 180 M. Vulcan Pittl & Bland 26 23 27 20 19 180 M.	et
% t	R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy	k
5 %	Perkins' Snow	4 51.45
t %	Novelty les Breakers	15. 代 15. 代
2 2	Mule Shoes	% ttt
2 2	Kitchen Ice Tongs	i d
	Kettles, 7 to 13 inches inclusive. P b 3 cc ne brass, 1 arger than 13 inches. P b 4 cc ne chameled. dis 45 knives. dis 25 knives Butcher Enives dis 26 dis 15 cc ne Shoe dis 15 cc ne chameled dis 25 dis 26 dis 15 cc ne chameled dis 26 dis 26 dis 15 cc ne chameled dis 26 dis 26 dis 15 cc ne chameled dis 26 dis 26 dis 15 dis 26 dis	
1	foran's Shoe and Bread Knives	200
1	Fable and Pocket	N 24 M
I	lable and Pocket See Cutier K nobs. arriage (Jan'd 8cc. P gross). dis 6ckro. lase—Common. dis 9ckro. Elastic End. No. 8 dis 9ckro. Elastic End. No. 8 dis 9ckro. Por. Jap'd. Por. Jap'd. Same discounts as Door Locks. "Por. Jap'd. Same discounts as Door Locks. "Por. Jap'd. Same discounts as Door Locks. "Por. Jurniture, Plain. 75c gross inch, dis 10-70 dis 10	16 16
1	" Plated Same discounts as Door Locks " Por Same discounts as Door Locks " Por 75c gross inch, dis to 1	
HS	Pleturs (T. & S. Mfg. Co.)	
1	adles. dis cotton dis cot	
T	Monroe's Patent dox \$4.00, dis 20 5 Lanterns. No. 0, \$10.00; No. 1, \$11.50 } With Guards, one extent.	
PBA	Anterns	
PED	Balleton Charleton Charl	
Si Ti	ammls'No. 1, \$7.50; No. 2, \$12.00 % doz., dis 45 % ownsend's Patent	
M	Lake Chalk Nos. o, 1, 2, 3, \$6.00, \$6.50, \$7.00, \$7.00	
U	ownsend's Patent. \$6.0 \$ dos. dis 3345 \$ Lines. Linen Fish dis \$2.25 \$ otton Chalk. dis 55 \$ Lake Chalk. Nos. 0, 1, 2, 3, \$0.00, \$6.50, \$7.00, \$7.00. dis 12&10 \$ \$7.00. dis 12&10 \$ \$7.00. dis 12&10 \$ \$7.10. dis 12&10 \$ \$1.10. dis 12&10 \$ \$1.	
T	Barnes & Deitz dis 30 % runk dis 30 % angstroth & Crane's List Jan. 1, '77. Round Key dis 40 % 70 %	
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	Dawton's Adinatable (19.2)	I days.	y Vermillion, Chinese
pission's Patent Excelaior. dis 23% Buck Bros. dis 24 % Buck Bros. dis 24 % Buck Bros. dis 24 % Buck Bros. dis 26 % Black Handles. dis 40&10 % Barrent & Co.'s. dis 60&10 % Screws. dis 60&10 % Screws. dis 60 % Gis 64 % Gis 65 % G	Coes' Genuine	Nos. 21, 22, 25, two cents advance on List for each Number. Nos. 24, 25, 25, four cents advance on List for each Number.	English Common Cot gold
Fist H'd Iron Clis 45 Fist Head Brass Clis 40 Fi	Collina & Co. s. dis 20 Cosi Genuine. dis 602 cosi Genuine. dis 702 cosi "Pattern Wrought). dis 702 cosi dis 702 cosi dis 702 cosi dis 702 cosi dis 602 cos	Above No. 25, special rates. Plain, 34 inch	Vermont. in casks 1)4c 90 x 52 to
Japanned, list of Plain Screws. Lag or Counton Coach. Coach Patent Gimlet Point, List per 100	" Briggs' Pattern	All Mandrel Drawn Tubes, 5 cents advance on List Prices. Fancy Tubing to No. 20. English, Scotch and Extra Patterns Fancy Tubing to No. 20.	# French (Paris)
Fight Head Brass. dis 4 s Fight Head Brass. dis 5 s Round Head Brass. dis 30 s Round Head Brass. dis 30 s Fight Head Brass. dis 4 s s Fight Head Brass. dis 4 s s Fight Head Brass. dis 5 s Japannel. Head Brass. dis 5 s Japannel. Head Conscience Conductor Co	No. I. " S4.0	Add to 2 cents 1/2 cent for each additional cutting	Linseed, Raw, in casks and bbis gal. 61c & 84c 6 x 8 to 1 Bolled.
	** No. 214, with Cogs	all Mandrel Drawn Tubes under 1/2 in., 25 cents per pound advance. Plain. ZENC TUBING.—net.	Prime Lard
Jack (Wilson'sh. dis 40kro g Jack (Wilson'sh. dis 55 Sash(T. & S. Mirr. Co.). dis 25 Shears and Scissors. Steel dis 80kro S	" No. 2½, with Cogs 50.00 " No. 2, 50.00 " No. 3, 71.00 " No. 4, 72.00 " No. 4, 72.00 " No. 5, 72.00 " No. 10, 72.00 " No. 10, 72.00 " No. 10, 72.00 " No. 12, 72.00 " No. 12, 72.00 " No. 12, 72.00 " No. 12, 72.00 " No. 24, 72.00 " No. 25, 72.00	Fancy Scotch and Extra Patterns GERMAN SILVEN TUBING.—dis 10 3	10
Shears and Scianors. Cast Steel. American dia 6.8 Section Science of the Section Science o	Crown No. 2. \$4.00 " No. 2½ 63.0 " No. 3 69.0 Eureka, No. 1 57.0	5 6 4 3 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
Heinisch Trimmers and Scissorsdis 60 %	Novetty, No. 10, with Cog Wheels	0 10 4	55 Engine soc inches, wi
Shenves	No. 2, Iron Common Gear	STELL.—DUTY: Bars, Ingots, Sheets and Collvalud at 7 cents & B., or under, 244 cents; over, cents, and not above 11, 2 cents & B; over 11, 34 cent & B. and to Sad val. Hallway Bars, 14, cents & B. Rallway Bars, in part Steel, 1 cent & B. Provided that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form of description, shall be classed as	G. B. WALB
Sheaves Sheaves Sheaves Sheaves Shiding Door, Sh. & E. list. Clas 902 x	Stamped Tinware.—New List Dec. 2, 1878. Common Stamped Ware	Bessemer or pneumatic process, of whatever form of description, shall be classed as American Unst Steel.	No. 103 Chambers Sc.,
Moore's Anti-Friction (Hanging) dis 44.5 Philadelphia Hanging dis 408.52.2.5 Shavels and Spades. Ames, New list, Jan. 1, '79	METALS.	Spring	
Philadelonia Inaukung. Shoveja and Spandes. Ames, New list, Jan. 1, '79. dis 20 % Kimball Shovet Co. dis 20 % oz 5 % Oid Colony. dis 30 % nemington's (Lowman's Patent). dis 30 % Remington's (Lowman's Patent). dis 30 % punning's Showels and Scoops. dis 50 % B. Rowland's "Regular," new list. dis 60 % dis 40 % Ovford Patent, new list. dis 40 % %	IRON.—DUTT: Bars, 1 to 1½C. \$\Pi\$ is Sheet, Band Hoop and Scroll, 1½ to 1¾C. \$\Pi\$ is provided, that none of the above Iron shall pay a less rate of duty than 3 per cent. Pig. \$7 \$\Pi\$ ton; Polished Sheet, 3C. \$\Pi\$ Wrought Scrap, \$\Pi\$ to ton Railroad 70C. \$\Pi\$ to \$\Displays Boller and Plate, 1½C. \$\Pi\$ h. Pis. Iron. AMPHICA.	Homogeneous	
B. Rowland's "Regular," new list. dis 40%; \$ Patent, new list. dis 40%; \$ Oxford Patent, new list. dis 40%; \$ Shevels and Tengs.	Foundry No. 1 ton \$18.co @ 19.00	" circular as to size	
Shevels and Tongs. Iron.nd Brass Head, R. & E. list	Coltness	Spring # D 8@ 9 Machinery # D 8@ 10 Gun or Homogeneous # D 12 @ 16 English Steel.—	
Sintes. Quare Frames, Round Cornered, by casedis 70 \$\text{Less than a case} \text{dis 6c&10 \$\text{\$c\$ Spoke Shaves.}} \text{Defiance Metallic} \text{new list, dis 25&10 \$\text{\$finter} \text{dis 4c&10 \$\text{\$c\$ Spoke Shaves.}} \text{dis 4c&10 \$\text{\$c\$ Spoke Shaves.}	Old Rails # ton 20.00 @ 21.00	Bost Cast. \$\psi\$ in 15\psi\$ Extra Cast. \$\psi\$ in 15\psi\$ Round Machinery, Cast. \$\psi\$ in 16\psi\$ Swaged, Cast. \$\psi\$ in 18c	
Reliev's (Stanley R & L. Co.) new list dis 25&10 %	Wrought Scrap, from yard. # ton. nom. 23.00 @ 24.00 Common Iron: § to 2 in. round and square	German Steet, Best. # B 130 d quality # B 100 d quality # B 100 d quality # B 100	Combination Punch and Shears.
Spoke Trimmers	% to 2 in. round and square	Circular as to sise 15 @ 50	Cuts Round and Flat Iron.
Tinned Iron	Rods—16 and 11-10 round and square # D 2.10 Bands—1 to 6x3-16 to No. 12 # D 2.40 Swedish Iron : Ordinary sizes	Pipe and Sheet, 2140 W B.	process and the second
Specima	Sheet Iren. Common R. G.	10	MANUFACTURER OF Punch 1/2 to 3/2 in., 3/2 in., 1/2 Lyon's Patent Hand
Racid & Barton Clis colls	Nos. 10 to 20. 9 to 25gc 35g 31 to 24. 9 to 35g 31 to 24. 9 to 35g 31 to 25. 9 to 35g 31 to 25g 31 to	Tin Lined Pipe. 12c, dis 10 Shoet. Drop 6\(\) c, Buck. 7\(\) b, did 10 Shot. Drop 6\(\) c, Buck. 7\(\) c, dis 10 Shot. Shot. Drop 6\(\) c, Buck. 7\(\) c, dis 10 Chilled Shot. Sc, dis 10 Chilled Shot. Sc, dis 10 Shot. S	DRILLS, SHEARS AND PUR
Tables \$2.50 \(\psi\) gross, net tin Cowles Hdw. Co.). dis 10 \$10 \$10 \$2.50 \$2	" 21 to 24, " \$\pi D 7\dc; " \$\pi D 6\cd 25 to 26, " \$\pi D 7\dc; " \$\pi D 6\dc; " \$\pi D 6\dc; " \$\pi D 7\dc;	b; Elecro-galvanized Platés, 26 # b; Manufacturer of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent Banca.	For Workers in Iron and Steel, as Send for circular and prices.
"Lightning" Screw Plate	Patent Planished	English	BUFFALO "CHA
Steams Stone. Shock of the stone of the ston	American Ingot	14x20 Prime Charceal	
Washits Stone (Boyd & Chase) No. 1 \$\psi\$ is c net Turkey Oil Stone (Boyd & Chase)4 to Sin, \$1.00 \$\psi\$ is to \$\psi\$. Slips "\$\psi_2.60 \$\psi\$ is dis 10 \$\psi\$.	Braziers' Copper, ordinary sizes, over 10 z., \$\frac{1}{2}\$ \$\frac{1}{2}	1X 1X 2X	
Silpa Silp	Lighter than 10 oz. \$\psi \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	I C 10X14	3 Qua
Gem	locomotive Fire Box Sheets. # n 26c Sheathing Copper, over 12 02. # sq. ft # n 26c Boit Copper. # n 26c Copper Bottoms. # n 26c	Prime Char. 2d qual. Coke. I C 14X29. 26.00 5.75, 5.00 \$.25. I X 14X20. 26.00 I C 20X29. 112.15 \$12.00 I C 20X29. 112.15 \$12.00 I C 20X29. 112.15 \$12.00 I C 20X29. 26.00 I C 20	4
Rising Sun	No Copper is Saeatining except 147,9 linches and not to exceed 34 os. to the sq. it. 14x48, by the case	I C 2023200 68 18-75 I C 14T20 M. F. Brand	10 12 16
Irondis so %; full cases, dis so&to % Cash Nickel Platedadd \$2.50 @ \$4.00 W dos, net) Try Squares and T Bevelsdis so&to % Star Try Squares and Bevelsdis so&to \$	For tinning both sides, double the above amount o'NEILL'S PATENT PLANISHED COPPER.—Not. 14 and 16 oz. and heavier. * D 310 By the case. * D 300	American, cash	20
New Printing Co. St. St. St. St. St. St. St. St. St. St	14 and 16 oz. and heavier. * # B 310 By the case. * # B 300 12 oz. and lighter # B 340	Sheet, Cask	Not
Shoe Nails, (new list)	(And all states not over 20 in. wide.) 20xto. 14 and 16 oz. and heavier	Paner Stack Old Motals &c	
Tap Borers. Ommon and Ring. Ives' Tap Borers. Enterprise Mfg. Co. Tapes, Measuring. American. Spring Tapes. Spring Tapes. dis 25% to \$5% to \$	Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire, BRASS MANUFACTURENS' FRICE LEST.—dis nominal. July 1, 1878.	Canvas linon.	Addre
Thermometers. Tin Case. dis 70 % Tebacce Eutters. Enterprise Mig. Co. (Champion)	Cash prices for Roll and Sheet Brass. For less quantity than 100 bs. add 30 \$0 b. High Brass. All Nos. not thinner than to No. 28, wider than 1 in., not wider than 14 in	White linen rags, No. 1	Sid
Thermometers. Th Case	All Nos. not thinner than to No. 25, wider than 2 in, not wider than 1 in	Soft Woolens Gunny bagging 396 Gunny bagging 396 Gunny bagging 396 Gunny bagging 496 Gunny bagging 496 Gunny bagging 496 Gunny bagging Gunny bagging Gunny bagging 496 Gunny bagging Gunny bagging 496 G	
Machines (P. & & W.)	34c. # 3 advance on each No. above Nos. 28 to 35, in- clusive. All Brass thinner than No. 38 is Platers' Brass. at48c Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in.32c	Rope cuttings	
" Newhouse Pattern dis 60810 \$ " Blake's Patent dis 40810 \$ Mouse, Wood. Choker \$\vec{4}\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Printers' Rules	Hard White Shavings, No. 1 372 48 80ft 1 1 1 1 1 1 1 1 1	
# Blake's Patent	Sheets wider than 50 in. and under 40 in. 420 Circular Sheets, in diam. from 4 in. to 14, inclusive. 340 5: 4: 0ver 14: 20: 30, 4: 440 4: 40 in. 540 LOW BEASS. 540	Book Stock 24 6 8 6 14 6 7 6 7 6 7 6 7 6 7 7 6 7 7 7 7 7 7 7	THE "ACME" FRY A Cold Handle Fry Pan Made in one
Trewels. Lothrone Brick and Piastering. dis 15 @ 105 Reed's Brick and Plastering. dis 15 5 Disaton's Brick and Plastering. dis 20 5 Peace's Plastering. dis 30 5 Cloment & Maynard's dis 20 5 Rose's Brick dis 14 5	40 % m more than High Brass, Gilding Metal, so % m more than High Brass, In Bars	Downs Maniles and Hardwares	NEW YORK STAMPING COM
Worrall's Buick and Plastering. dis 20 \$	(Planed or Polished	Commons	311 Avenue A, New York, U. S. A.
Triers.	metal, inwidth rin. to 1/4 thinner than No. 28, 30 P m	Copper, heavy. 11½ @ 11½ @ 11½	
Viseta Box Trenton . New List, Jan. 22, 79, dis 35, Wilsons Rew List, Jan. 22, 79, dis 35, Wilsons Rew List, Jan. 22, 79, dis 35, 5 "Crows" (A. E. Hildicks), 40 to 100 hos. dis 35, 100 currency. A. E. Hildicks), 40 to 100 hos. dis 35, 100 currency. A	Motal, in width ½ in. to ½, inclusive, not thinner than No. 28, 20. \$\pi\$ advance. Metal, in width ½ in. to ½ thinner than No. 28, 50. \$\pi\$ advance. Motal, ½ in. in width and less, soc. \$\pi\$ advance.	Yeliow Motal 10 6 Brass, light 854 6 " heavy 1054 6 Heavy Composition 15 6 Old Lead, solid 256 8 Tea Lead .254 8 34 Powter No . 16 6 Wrought No . . 6 Wrought No . . . Macchair Too 	
"Crown "(A. H. Hildiers) 40 to 100 108., 140 currency. dis 20 \$ 15 Park, Long & Co., new list Jan. 22, 79, dis 25 \$ Peter Wrights. 15540 Parallel, Parker"s. dis 20 \$ Wilson's. dis 45 \$ Howard's dis 25 \$ Morrill's dis 25 \$	Motal, 4 in. in width and less, soc. # B advance. Any of the above widths out to particular lengths, add 70. # B. GERMAN SILVER MARKET METAL AND WIRE. Market Motal. Wire.	Zinc. 34 6 34 9 24 24 25 25 25 25 25 25 25 25 25 25 25 25 25	
Merrill's	10 4 4 4 56 76 188 188 18 4 4 4 1 1 1 1 1 1 1 1 1 1 1	Machinery Iron. per ton 13.00 Light Iron. per ton 11.00 Stove Plate. per ton 11.00 Grate Bars. per ton 5.00	CHAMPION CHAPTER
4 Gingan and Admirable discourse	German Silver Sheets over 12 in. wide and weighing more than 10 %s. \$2.00 & %. Advance 2c. for each additional inch in width above 22 in. and 2c. W & on each No. thinner than Nea. 26 to	Paints, Oils, &c.	HOC RINGER RINGS and HOLDER.
"Family." List. Stear" 5	56. Inclusive All German Silver thinner than No. 56 is Platers, at 500 W a additional. German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.	Paints. Black Lamp, Coach Painters. # 2 200 Colors Colo	only double fing ever in vented. The only Ring that will effect ally keep Hogs from rooting. No sharp points in the nose.
Protective (upper) per foot, \$1.00	12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap. ERASS AND COFFER WIRE. Gild's and High Byses. Low Brass, Copper.	Hack Paint, in oil kegs, so assi'd oan, me Blue, Prussian, fair to best 95 56	points in the nose. Ringers. 74c. Rings, 50c. 10c. Holders, 74c. Huskers, 14c. CHAPUBRES, BERING & QUINLAN,

diue Chinese dry	Sunds				
Since Chinese dry Spe	Asph atum Bensine Chaik Block Dryer, Patent, Am'n Prostings Glue, White	*******			al. (60
Carmine, 40	Chaik		******	******	
Freen, Chrome, 23c	Block	*******	*****	******	
" in oil	Frostings.	NOS'	cans,	109801	100, 90
4 if in oil 460	Glue, White		*******		@ 440
ron Paint, Bright Red # B 2540	Glaziers' Peints, Zinc		*******	******	300
Red P n se	Gum, Copal	*******	*** ****	******	60
Brown # 1990	" Damar.	******	******	*****	200
Ground in Oil, Reight Red 2 h side	" Shellac, Engitsh	********	******	*** ***	506
** ** Red ** m 5c	Tithana Wasteh dark.	*******	******		250
Brown # 10 45/c	Mineral Wool	*******	*******		o gola
Purple # Brown # B 4/6c Ground in Oil, Bright Red # B 5/6c Red # Brown # B 4/6c # Brown # B 4/6c # Purple # Brown # B 4/6c	Gum, Copal. "Damar. "Shellac, English. "Shellac, English. "Author of the Moneral Wool. Pumic Stone, selected Lump powdered. Putty, in bladders. "In bulk. Rotten Stone, soft, English. Spirts Turoentine. Whiting Spanish.			m 174	4 (3, 60
Orange Mineral	" powdered	*****	******		39(0
Wondian (N. C.) dry asst'd cans, 11c; kegn, 4c Indian dry, 96: 10	Putty, in bladders	*******	******		2540
" English	Rotten Stone soft English	******	******	******	30
Venetian (N. C.) dry	Spirits Turpentine		*******	******	390
" Indian dry 9@ 120	Whiting Spanish				
tose Pink10 @ 13c					
denna, American, Raw40	Gine				
Description Compared Compar	FRENCH WIND	OW GL	LEG.		
" Raw " 15 @ 250	Prices current pe	m ham a			
Jmber, Burnt4 @ 8c	. 2740es ourrent pe	a. nom ol	30 Jee	F	
" in oil	Single ThickDis	connt 6	in Breeze	an of	
Raw	Single InstaDis-	bount o	NOC 1 Vac:	20 76	
Vermillion, Chinese	SIZES.	zet. I	ad.	ad. I	4th
7ermillion Chinese			-	'Acres	
" Trieste	6 X 8 to 10 X 15	\$ 8.00	\$ 6.75	\$ 6.25	# 5-75
American, Common	11 X 14 to 16 X 24	8.75	8.20		7.00
" " in oil	15 X 36 to 24 X 30	12.75	11.50		0.75
White Lead, American, Dure dry. 7 to 8c in oil. 75c to 8c White, Parts, English, prime. in bbls. 26 25c cellew Ochre, French. 11 to 11 in oil. asst'd cans, 11c; kegs, 6c in casks 1/5c	26 x 28 to 24 x 36	13.50	12.25		
fellow Ochre, French	26 X 36 to 26 X 44	14.75	13.75	11.75	
in oilasst'd cans, nc; kegs, sc	20 X 40 to 30 X 50,	10,25	15,00	13.00	
Yellow Chrome	20 X 50 to 34 X 56	17.25	16,75	19,40	
" in oil	34 X 58 to 34 X 60	10.50	18.00		
ine White, American No. 1, dry70	18 x 22 to 20 x 30 14 x 36 to 24 x 30 26 x 26 to 24 x 30 26 x 36 to 26 x 44 26 x 46 to 30 x 50 30 x 56 to 36 x 44 30 x 56 to 34 x 56 30 x 56 to 34 x 56 30 x 56 to 40 x 60	21.00	19.50	18.00	
in oil 14 3 18 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Damble Which Die				
" in oil	Double Thick.—Disc	count 70	0 to 708	25 %	
	SIZES.	ist.	ad.	ad.	41 b.
Olls.	6- 84				-
	6 x 8 to 10 x 15	14.75	13.75		\$ 9.25
Anseed, Haw, in casks and DDIs w gal. 610 & 640			17.75	10.00	857.3
Anseed, Naw, in casks and blis	18 X 22 to 20 X 30	19.00			
Anseed, Haw, In casks and bbis # gal. 510 & 840 1 660 & 690 (leached Whale	18 X 22 to 20 X 30	90.00	TO 95	16.50	
### Canada	18 X 22 to 20 X 30	90.00	TO 95	18.24	
disseed, Raw, in casks and bbls.	18 X 22 to 20 X 3h	90.00	TO 95	18.24 19.25	
Pelmo Lard	18 X 22 to 20 X 35	90.00	TO 95	18.24 19.25 21.25	
77ime Lard	18 X 22 to 20 X 30. 15 X 36 to 24 X 30. 26 X 36 to 24 X 36. 26 X 36 to 26 X 44. 26 X 36 to 30 X 44. 30 X 52 to 30 X 54.	90.00	19.35 20.75 23.00 25.00 26.00 27.75	18.24 19.25 21.24 22.25 24.75	
77ime Lard	36 X 46 to 30 X 50	21, 40 23,00 24,00 27,00 28,40 30,00	19.35 20.75 23.00 25.00 26.00 27.75	18.24 19.25 21.24 22.25 24.75	
77ime Lard	36 X 46 to 30 X 50	21, 40 23,00 24,00 27,00 28,40 30,00 31,75 35,40	19.35 20.75 23.00 25.00 26.00 27.75 30.00	18,24 19,25 21,24 22,25 24,75 27,00 30,25	
1 2 2 2 2 2 2 2 2 2	26 x 46 to 30 x 50. 30 x 52 to 30 x 54. 30 x 50 to 34 x 50. 34 x 58 to 34 x 60. 35 x 60 to 40 x 60. Sizes above 40 x 60.	21, 40 23,00 24,00 27,00 28,40 30,00 31,75 35,40	19.35 20.75 23.00 25.00 26.00 27.75 30.00	18,24 19,25 21,24 22,25 24,75 27,00 30,25	every
Firme Lard	15 x 45 to 30 x 50. 30 x 52 to 30 x 54. 30 x 50 to 30 x 54. 30 x 50 to 34 x 50. 31 x 50 to 40 x 50. Sires above 40 x 50. \$\$10.00 five inches.	21.50 23.00 25.00 27.00 28.50 30.00 31.75 35.50 per bo	19.25 20.75 23.00 25.00 27.75 30.00 32.50	18.24 19.25 21.24 22.25 24.76 27.00 30.24 Ta for	every
1 2 2 2 2 2 2 2 2 2	36 x 46 to 30 x 55. 30 x 52 to 30 x 54. 30 x 50 te 34 x 55. 31 x 58 to 34 x 56. 31 x 58 to 40 x 56. Sires above 40 x 50. The linches. An additional to per cent. Glass more than 40 inches	21.50 23.00 25.00 27.00 28.50 30.00 31.75 35.50 per bo	19, 25 20, 75 23,00 25,00 27, 75 30,00 32, 50 0X ext	18.24 19.25 21.24 22.25 24.75 27.00 30.24 tra for	overy
Firme Lard	15 x 45 to 30 x 50. 30 x 52 to 30 x 54. 30 x 50 to 30 x 54. 30 x 50 to 34 x 50. 31 x 50 to 40 x 50. Sires above 40 x 50. \$\$10.00 five inches.	21.50 23.00 25.00 27.00 28.50 30.00 31.75 35.50 per be will be wide.	19,35 20,75 23,00 25,00 26,00 27,75 30,00 32,50 0x exi	18.24 19.25 21.25 22.25 24.76 27.00 30.25 tra for rged f	or all ove 52 inited





In Plates. Shears for Plates and Bars and Power JNCHING PRESSES.

adapted to all trades.

AMPION"

Freezers.

Quart Geared. 16 Quart Fly Wheel
20 ""
32 " "
40 " "
32 " Frame.
40 " "

Two 20 Quart Duplex.

ot the Cheapest, but the Best.

nd for illustrated Price List.

dress Sole Manufacturers,

dney Shepard & Co.

BUFFALO, N. Y.,

CHICAGO, 111.

PAN, MPANY



Patented Nov. 14, 1876; Feb. 5, 1878.





BROWN'S
HOC AND PIC
MINGER and HINGS
Only single Ring in
the market that closes
on the outside of the
nose. No sharp points
in the nose to keep it

CHAMBERS, BERING & QUINLAN, Exclusive Hanufacturers, Decatur, Ill,

No. 235.)

AMERICAN SCREW CO.

Providence, R. I.,

MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,

AND INCREASING THE ASSORTMENT DAILY.

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a lower cost to the consumer than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION.

PHILADELPHIA, 1876.

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons and decreed an award in conformity therewith. PHILADELPHIA, November 8, 1876.

REPORT ON AWARDS

Product: Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets. Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture. G. L. REED. Signature of the Judge.

Approval of Group Judges Daniel Steinmetz, Jas. Bain

G. I. Reed, J. D. Imboden, J. Diffenbach, Dav. McHardy

Chas. Staples,
A true copy of the record. Francis A. Walker, Chief of the Bureau of Awards,
Given by authority of the United States Centennial Commission. A. T. Goshorn, Director-General.

J. L. CAMPBELL, Secretary.

J. R. HAWIT, BY Fresident.







After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

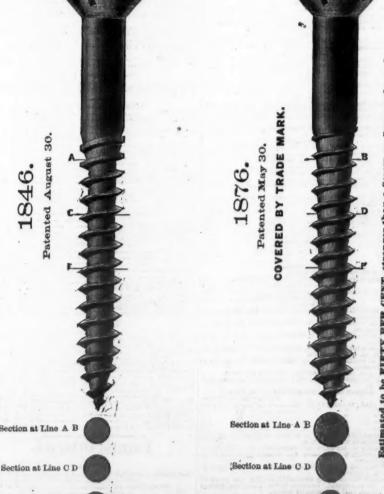
The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the wear point of screws, as formerly made, is at the heel of the thread, where all





Section at Line E

the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

OPPE WOL

CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substartially as described."

B. KREISCHER & SONS,

CLAY RETORT WORKS.

Established 1845. foot of Houston Street, East River, NEW YORK.

The largest stock of Fire Brick of all shapes and hand and made to order at short notice. on hand and made to order at short hotels.
Capela Brick, for McKenzie Patent,
others. Fire Mortar, Ground Brick, Clay a
d. Superior Kaolin for Rolling Mills and four
Stone Ware and other Fire Clay and Sa
my own mines at New Jersey and State

NEWTON & CO.,

PALMER, NEWTON & CO., ALBANY, N. Y., Manufacturers of

BRICK Stove Linings, Range and Heater Linings

Cylinder Brick, &c., &c. M. D. Valentine & Bro

FIRE BRICK And Furnace Blocks DRAIN PIPE & LAND TILE. Woodbridge, - - - N. J.

A. HALL & SONS, Perth Amboy, N. J. HALL & SONS, Buffalo, N. Y.

FIRE BRICK

of reliable quality for all purposes, manufactured of the best New Jersey Fire Clays. Also, Architectural Terra Cottu, Fire Clay, Fire Sand, Kaolin, Ground Fire Brick and Dismantine Building Brick.

Brooklyn Clay Retort FIRE BRICK WORKS.

Watson Fire Brick Manufactory

JOHN R. WATSON, Perth Amboy, New Jersey. FIRE BRICK,

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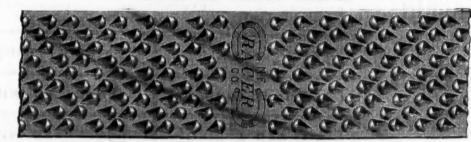
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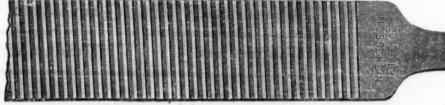
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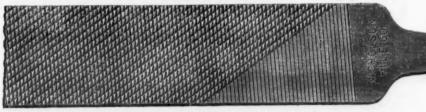


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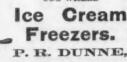
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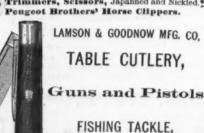
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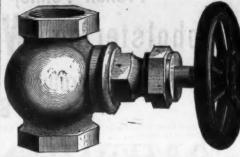
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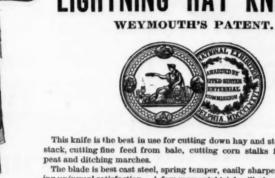
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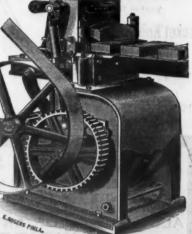
The Patent Combined Dinner-Pall and Lantern.

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night. Manufactured by JOS, HAIGHT,
PORT CHESTER, N. Y.
Sent by express on receipt of
L.C. Special attention given
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GREGG BRICK MACHINES

Masterpieces Centennial Exposition, 1876."





A warded Highest Prise Paris Exposition, 1878.
The above is a cut of Gregg's No. s Brick M
chine, simple, strong and efficient, for making ar
re-pressing bricks. Gregg's Triple Pressure Bric
Machines. Gregg's Combination Brick Machine
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every city and town. Send for catalogue.

GREGG BRICK CO.,
408 Waluut st., Phil adelphis, Pa.

PHILADELPHIA. (Corrected speakly by Lloyd, Supplee & Welton).	Speens
Por 60 or 90 days, interest added at 10	Tanned dis 15
Aprile	Springs — Torrey
over #50 lbs	Gem Coll No. 1, Large Jap'd
Reading No. 12	Steve Pelish,—Gem
Aprile	Thoks. Brads, dec.—New List
Lots of 10 to 25 dosan special price.	Double Pointed Tacks discrete
Hed indian, beveiled	France Control lacts distributed in the control lacts distributed
Augers Aus Augers dis 50 @ 55 g Bates' Aug Augers dis 50 @ 50 g Cook's Augers dis 50 @ 50 g Cook's Augers dis 15 g	Girard (Coe's Pattern)
Walrous dis 49 s. Benjamin Pierce Auger Bitts dis 49 s. Grisweld Auger Bitts dis 50 @ 50 c. S. Grisweld Auger Bitts dis 50 @ 50 c. S. Grisweld St. G	Agricultural— dos 10 to., \$3 60; 12 ln., \$5 40 nct; case Coes Genume
Jennings Pat. Hol. Augers, list \$48 \$ doz. dis 25410 \$ Bonner's Pat. Hol. Augers \$48 "dis 25410 \$ dis 25410 \$	Phila. Tool Co., Duplex
Sicarus Fat. not. Luck	Pails Tool Co., Duplex Co.
Bevin Bros. Mills Bells	Tinned Broom Wire
Bett and Rivet Clippers. Chambers No 1, for & boltt, each \$ 750 dis. 25 \$ 900	Universal, No. 24
Haring Machines.— List \$9 00 dis 40&19 g	" No. 2 " 63
Angular, with Augers. "11 00 dis 40&10 \$ Angular, without Augers. "7 00 dis 40&10 \$ without Augers. "7 00 dis 40&10 \$ water Carriage Bolts dis 75&2 \$	PITTSBURGH.
Philadelphia dis 70 s Philadelphia dis 50 s Stanley, Wrought Shutter dis 50 s Stanley, Rarper dis 60&5 s	Wood's Patent Planished Sheet. 1st quality (A)10½0 2d quality (B) Plate Iron—3-16 to ½ in. thick
Backus	Galvanized Iron-Juniata, Nos. 14 to 20
Buttas - Uast Fast Joint, Narrow	Plate Iron—3-16 to ½ in. thick. Galvanized Iron-Juniata. Nos. 14 to 20. 120 No. 27 to 24. 130 No. 25 to 24. 130 No. 25 and 26. 140 No. 29. Common and imperfect Juniata, to 50% off count, 35 to 40%.
Acers, Loose Pin	Gount, 35 to 49 %. Galvanized Common. No. 20
Mayer's Loose Fin. dis 50 % Wrought Loose Fin. dis 50 % Wrought Loose Fin. dis 45 % Asrow, Fast. dis 50 %	No. 21 & 22 .6 1 & 7 14 " Nos. 21 & 223.5 Bridge Iron.
Bind Batts	Carnegle Bros. & Co.'s list. Beams and Channels. Solid Wrought Iron Beams, 3 to 10\(\) (in.x30 ft\(\)
Clark	Deck Beams, 7 to 9 in. by 30 ft
Huffer's. Chains.—German Haiter and Coll	" "12 in by 30 ft
Barrow, Fast. dis 50 \$	I m.x i m. to 5 in.x j m. Angle Iron, Equal Sided, 1xt to 15x154 in. \$2 " 2x 2 to 4x4. Unequal Sided, 2xt 54 to 5x4. Square Root Angles, 2x2 to 35x356. Star Iron, 15x154 to 4x4. Sash Iron, 15x253-10. Miscellaneous Shanes, varlous shapes \$\mathbb{T}\$ b, 2.6 Special prices for large lots.
Okinela Socket Firmer dis 53, 54:10 \$ Socket Firmer \$5 00 to £ gold	Unequal Sided, 2x13/ to 5x4. Square Root Angles, 2x2 to 31/x31/4
Plate dis 504:10 \$ Plate dis 504	Sash Iron, 194x44x3-16 Miscellaneous Shanes, various shapes# B, 2.6 Special prices for large lots.
Plate. dis 25 g Cafee fillis.—Box and Side. dis 25 g Enterprise. dis 20 s Outlery.—Walden Pocket dis 35 5 s cash Outlery.—Walden Pocket dis 35 5 s cash Lander. Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manu facturers prices net.	Nails, Fence and Brads.
Goodow Mrg. Co. and Meriden Cuttery Co., Manu- facturers' prices net.	tod to 6od \$2.15' 4d and 5d
facturers price ac- Pra wing K nives.— Hart Mrg Co.2. dis 65, 52:10 s Adjustable Handis. dis 20 g	3(in. Barrel. 136 in. 137 in. 138 iii. 138 ii. 138 iii. 138 ii. 138 iii. 138 ii. 138 ii. 138 ii. 138 iii. 138
Tined	Lining. 74 in
Burnished 375 4 25 4 75 5 25 6 40 7 40 8 60 9 90 No 0 1 2 3 4 5 6 7 8	Clinch—Ali sizes. Slating.
	4d. 3.15 3d. Finishing. 136 to 136 in
Byencer	134 " 6.15 234 " and over
### 2 1236 net Ctown—15 in. roll	rod to 3od
Speacer	Clinch-All sizes Stating
Yerkes & Plumb'sdis 20 x	Each half keg to cents extra.
Hatchets Yerkes & Plumb	date of invoice. An abatement of 10 cents po allowed upon orders of 200 kegs or over.
### ### ##############################	Square, Flat and Octogon Tool Steel. 36 to 2 in
Blued and Pointed. St 28 26 25 24 28 Globe	34 and 314 to 4 in
	% to 2 in
from and Knoba. Branfordnew list, dis 60£10£2 % cash Gaylord Cabinet	Cast Spring Steel. 1½ to 3x5-32 to 3-16 in 1 to 4x½ to ½ in 6c 34 to 1½x5-32 to 3-16 in
Polished and Pointed	I to 423 to 36 in oc 34 to 19323-23 to 3-16 i Solid Cast Steel Plow, 4 to 16 by 3-16 to 36 in "Iron Center Plow," 4 to 1623-16 to 36 in "Iron Back Plow," 4 to 1623-16 to 36 in Soft Steel Center Plow, 4 to 1623-16 to 36 in Landside and Cultivator, C. S., 36 in. thick. Circular Plow Coulters, 5-23 to 36 in. thick. Reaper and Seythe. Fork and Hoe. Horse Rake Teeth, tol ength.
No 97 58 59 60 61 62 63 4fs 50 x 9 103	Soft Steel Center Plow, 4 to 16x3-16 to 34 in Landside and Cultivator, C. S., 36 in. thick Circular Plow Coulters, 5-32 to 34 in. thick
Square Candle and Oll	FOR and House services and the services are services and the services and the services and the services are services and the services and the services and the services are services and the services and the services are services and the services and the services are services are services and the services are services and the services are services
Guarda, 50 cents extra per dos. not. Lawa Mowers.—Pennsylvania	Cutter Bars, C. S
Currot. Mewers.—Pennsylvania dis 3'&10 Philadelphia dis 30&10 Excelsion Garden Pumps.— Holland Fatent. List 5.00 dis 20 \$	Planters' Hoe, C. S Hoe, C. S Sheet Steels.
Long and Short Cutter 2 doz. 29 00 @ 9 50 net Pennsylvania Pettern 9 50 @ 10 00 net	Horse Rake Teeth, tol ength. Finger Bars. Cutter Bars. C. S. German Spring Steel. Cornstalk Cutter beveled to length. Planters' Hoe, C. S. Hoe, C. S. German, 10 to 16 g. 70 Common C'st, 17 to 2 g. 17 to 20 g. 18 to 1
List 5.00 dis 20	Common C'st, ioto 16; 8c " y to 20 g. Purnace, Floor and Straightening Plates. Housings and Castings not otherwise specified. Guide Plates. Spindles and coupling boxes. Spindles and coupling boxes. Spindles and coupling boxes. Spindles and roupling boxes. Spindles and Plates. Spindles and Plates. Pipe Mill Castings under to list. Spur and Bevel Wheels, large. "" small. Pulleys up to 30 inches. "" ore 70 inches. Engine Clatings, light. ** Chilled Rolls. Childe Rolls. 6 to 7 in. diam., 7 to 20 in. long. 8 to 15 in. " 8 to 40 is. " 15 to 24 in. " 15 to 7 i is. " 24 to 51 in. " 75 to 108 in. " Heavy Hardware,
Landers, Frary & Clark's Petroleum. dis 52% & 10 g Brass Liquor Cocks. dis 20 & 10 g Cark Lined dis 50 g	Spindles and coupling boxes
# eat Cutters.—Dixon's	Pipe Mill Castings. Rolling Mill Castings under 50 lbs. Spur and Bevel Wheels, large.
Hale's	Pulleys up to 30 inches. "over 30 inches. Ragine Chatings, light
Class	heavy
Aubun dis 25 & 10 2 Rew York Tool Co. dis 25 & 10 2 Rew York Tool Co. dis 20 & 10 2	8 to 15 in. "8 to 40 in. "15 to 24 in. "15 to 73 in. "24 to 31 in. "72 to 108 in. "
Butener's and Levels. gold 2, \$5 49 Plumbs and Levels. gtalley's Adjustable	Heavy Hardware. Bolts, Screws, Nuts, etc. Lewis, Oliver & Phillips, discount off Standard
Rose-Rickford	Bolts, Screes, Nuts, etc. Lewis, Oliver & Phillips, discount off Standard Carriage & Tire Bolts, ordinary orders 75, & 3, 6 Stove Bolts. 40% 5, 6 Elevator Bolts. 50% 5, 6 Machine and Square Head Bolts. 50% 5, 6 Cooch and Lay Screes. 50% 5, 6
Kuies—Stariey Boxwood. dis 70&10 g Stanley Ivory dis 60&10 g Stanley Ivory Hart's Pattern dis 60&10 g	Rachine and Square Head Bolts
Lbs. 50 100 150 200 350 300	Coach and Lag Screws
Engilah Pattern	# % ex. Nuts and Washers in 5 % boxes, ic # Strap and T Hinges
Lbs 50 100 150 200 250 300 89 mares.	Cast Iron Washers
Etee and Iron. 1889 1881 1882 1885 1885 1885 1885 1885 1885	Single Trees, Neck Yokes and Double Trees, from best selected hickory, and ironed comple the most approved patterns
Sharpened Book at ou het	No. 1 Southern Plow Single Tree, Ironed complete, Irons all Wroughteach, 2 No. 2 Western Plow Single Tree, Ironed
Sharpened	Fire Shoves and Pokers. Single Trees, Neck Yokes and Double Trees, from best selected hickory, and ironed complet the most approved patterns. No. 18 outhern Plow Single Tree, Ironed complete, irons all Wrought. No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought. No. 3 Wagon Single Tree, Iron complete, Irons all Wrought, except Malleable Ferrule.
Cupper No. 6, Fainted Red, Boxed and Sharpened. • for \$1.25 net Sawg — Diaston's Hand, Panel and Rth. • dis 20 5 Dission's Circular. • All 20 5 Cress-Cus No. 2, Plain Tooth. • ft., 45c. net Patent Tooth. • ft., 55c. net Champion Tooth. • ft., 55c. net	No. 4 Wagon Single Tree, Ironed complete,
Champion Tooth	riveted on; one side acts as a wear fron for wheel to rub againsteach, 50 Neck Yoke, Ironed complete, Irons all Wrought except End Ferrules, with We. Iron Hingseach, 60 Southern Flow Double Tree, Ironed com- plete, frons all Wroughteach, 50 Wagon Box Strap Bolts— For orders of 100 Set, 45k10 % dis.
hars. Potts' Patent	Southern Flow Double Tree, Ironed complete, Irons all Wrought. each, 50
** No. 1 *** 20 dis 10 \$	to in. long by 7-16 at Screw End, # set of 8 bolts.
Turkey Oli Stone No. 1	10 III. 930 H H B H
Hindostan Oil Stone No.1 \$ 3 4 6 446 net	14 in
Flat Head Irondis 60 s	18 in. "

Т	- C
Spoons.	
Plate dis 40 @ 40&5 \$ German Silver	3
Speans	37
Gem Coll No. 1, Large Jap'd. 9 doz \$250) No. 2, Medlum Jap'd. 250 dis No. 3, Small 50 200 Stocks and Dies. dis 1045 4 Steve Pelish.—Gem. 9 gross, \$450, dis 5 5	V
Onyx "\$4:00 & 428 not Tacks. Brads, &cc.—New List	OHE d
Praps. Genuine Oneida—Newhouse	26
Girard (Coe's Pattern) dis 50 @ 10&10 \$	1 1 1
Bright or Ann'd, No. 19 to 36dis 60 \$	
No. o to 18 dis 62% \$ Coppered 0 to 18 dis 55% Tinned Broom Wire dis 55% Galvanized, No. 7 to 18 Market list, as 90 \$	2 2 2 2 2 2
No. 24 to 55	3
PITTSBURGH.	2333
Merchant Iron. Wood's Patent Planished Sheet. 1st quality (A)	02 02 02 03
Plate Iron-3-16 to 1/4 in. thick	-
Nos. 14 to 20. 120 No. 27 150 No. 21 to 24. 120 No. 25 160 No. 25 No.	
Roofing Iron, Corrugated or Crimped. Galvanised Common. No. 20	,
Solid Wrongat Iron Beams, 3 to 10% in. x30 ft., # h 2%c	
" 12 in by 30 ft	
Angle Iron, Equal Sided, 1x1 to 13(x13) in	
## Angle Iron. ## 22 to 434 Unequal Sided, 1x1 to 15x13 in ## 2.5c Unequal Sided, 2x13 to 5x4.	2
Natis. Fence and Brads. \$2.00 \$6d and 9d 2.60 \$3.15 \$4d and \$5d \$3.00 \$6d and 7d 2.65 \$3d \$4.95 \$45	,
\$\frac{1}{2}\text{in.} \\ \frac{1}{2}\text{in.} \\ \frac{1}{2}in.	
% in	1
5d. Slating. 4d. 3-15 3d. 3-90 4d. 51 3-15 3d. 5-15 Finishing. 136 to 194 in. 4-15 1, in. 7,15 2, in. 3-90	
Finishing. 15t to 15t in. 4.15	
Fine Blued. 3.90 2d 5.15 Que Spikes—All sizes 2.40 Root Spikes—All sizes 2.40	1
Boat Spikes—All sizes. 2.90 Each half keg 10 cents extra. 2.90 Each half keg 10 cents extra. 1900 Territory and the size of th	,
_ mieel.	
\$\frac{\text{Square}}{\text{to 2 in}}\$. \$\frac{\text{Square}}{\text{square}}\$, \$\frac{\text{rot}}{\text{and d}}\$ & \$\frac{\text{cond}}{\text{square}}\$ & \$\frac{\text{square}}{\text{square}}\$ & \$\text{	ľ
% and 3½ to 4 fn	-
T to 4X¼ to ½ in 6c 54 to 1½Xx 52 to 3-16 in 8c **Agricultural Steels.** Solid Cast Steel Plow, 4 to 16 by 3-16 to ½ in 6c "Iron Center Plow," 4 to 16x3-16 to 3¢ in 6c "Iron Center Plow," 4 to 16x3-16 to 3¢ in 75¢ "Iron Steel Center Plow, 4 to 16x3-16 to 5¢ in 75¢ Soft Steel Center Plow, 4 to 16x3-16 to 5¢ in 6c Landside and Cultivator, C. S., ½ in. thick. 85¢ Circular Plow Coulters, 5-32 to ½ in. thick. 10c Reaper and Scythe. 12c Fork and Hoe. 6c	'
Cornstalk Cutter beveled to length	1
German, 10 to 16 g 7c Common C'st, 17 to 20 g9c	
Common C'st, 10 to 16g. 8c " 17 to 20 g130 Rolls and Castings. Furnace, Floor and Straightening Flates	1
Roung still Castings under 50 lbs 3 C	-
Spur and Bovel Wheels, large 3 c	
mail c c c c c c c c c	
ALLEN V ALEXANTERS	Ī
Lewis, Oliver & Phillips, discount off Standard List* Carriage & Tire Bolts, ordinary orders 75, & 35 off net Stove Bolts	
Pat. Hot Pressed Sq. and Hex. Nuts	2
# h ex. Nuts and Washers in 5 b boxes, to # h ex Strap and T Hinges. 6ok: 0 off ner Harrow Teeth 6ok:net Skein Boltsnet Skein Bolts	ł
Skein Bolts	1
Wagen Hardware, Single Trees, Neck Yokes and Double Trees, made from best selected hickory, and ironed complete, in the most approved patterns. No. 1 Southern Plow Single Tree, Ironed complete, irons all Wrought. No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought. No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought. No. 3 Western Single Tree, Ironed complete, Irons all Tree, Iron complete.	

Steel Tee Calks. Thistlewood & Co. 's Self-Sharp Shoes. Thistlewood & Co. 's Self-Sharp Shoes. Toe Calks. White Lead in Oll, Assorted K. " 15 % Tin Pa. Red Lead. in Self-Self-Self-Self-Self-Self-Self-Self-	ening S ed Lee egs (all ls, 100 egs, 644 854 655 854 655 854 ess the r if pa nt of 1	ad. I sizes b Cas c; in b c; c; c; c; cve: an 500 id with	oarrels r coolb	5.50 1b. 80 7160 8 c 8 c 8 c 8 c 8 c 8 c 8 c 8 c 8 c
Single Strer	AA.	A. 1	В.	C.
6 x 8 to 10 x 15	8.50 10.75 12.25 13.00 14.50 15.00	\$6.75 7.75 9.75 10.75 11.50 13.25 14.00	7.25 8.75 9.00 9.75 10.75 11.25	\$5.75 6.50 7.75
Double Strength. 6 x 8 to 10 x 15 11 x 14 to 16 x 24 15 x 36 to 24 x 30 15 x 36 to 24 x 30 30 x 36 to 24 x 30 40 x 24 to 10 x 24 30 x 36 to 30 x 30 30 x 50 to 30 x 36 30 x 50 to 30 x 36 30 x 50 to 34 x 56 30 x 50 to 34 x 56 30 x 50 to 40 x 50 30 x 50 to 40 x 50 30 x 50 to 40 x 50 30 x 50 to 40 x 50	12.60 13-75 17.25 19.75 21.00 23.25 24.00 25.75 27.75 29.25 33.25	11.00 12.50 15.75 17.25 18.50 21.25 22.50 23.25 25.00 27.75 30.00	10.00 11.75 14.00 14.50 25.75 17.25 18.00 19.25 21.75 24.00 27.75	10.50
An additional 10 per cent. glass more than 40 inches wi inches in length and not maki inches, will be charged in the	will b	e cha ll size re tha	rged for about 81 u	or all ve 52 nited

CHICAGO.					
(The Chicago Stamping Co., 10, 12 & 14 Lake St.)					
March 8, 1879.					
Tin Plate.— 14x20, IXX, Ch' Best. 11 25					
10v14 [41 (7h1] Heat 7 95 DC 100 Place # # 2 95					
10x14 Lx, " 9 25 Dx, " 925 Dx, " 925 12x12, IC, " " 7 25 Dx, " " 11 25					
14x2\(\frac{1}{2}\) \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}2\) \(
20x28, IC, Charconi Rooning, Good					
20x28, 1C, "Best					
10x14. IC. Coke Plates					
14x20, IC, 675 10x20, IC, 975					
Phone Win -					
Large rigs18c Bars					
Zinc, sneet, 500 to 1000 m. Casks 6%c					
Loose Sheets					
Conner.—Hottoms					
Sheathing					
Boiler lengths 8°C Ingot					
Ingot					
30x60, 6 to 7 lbs * 3 30c 30x60, 10 to 12 lbs * 3 26c 30x60, 15 to 160 lbs * 24c					
Solder F. S. & Co. 7 make					
Best Fine					
No. 1					
Antimony					
Babbit Motal-F.S. & Co.'s					
No. 210c					
Smooth, Smooth Smooth					
Wo 24 8 C 3 80c 53/c 7 C					
25 & 26 3 20c 4 c 6 c 14c 27 3 40c 4 20c 634 c 14c					
Colvented tree.—dis 45. 4					
No. 16 to 20					
25 & 26					
Russia Iron No. 1 Stained					
Perfect					
A10%c in sheets, 1c higher Lead Pipe, in full colis 5%					
Pig 5 c Lead Pipe, when cut. 6					
Bar 5%c Sheet Lead 6% Wire—Bright din 50 7					
Coppereddis 45 %					

LANE & BODLEY CO.,

STEAM ENGINES.

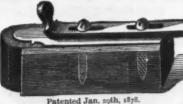
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For Fastening Cabinet Ware. Closet and House Doors, &c We call the attention of the trade to these Wrought Brass and Iron Bolts, as being the best and cheapest in the market. Sizes, two inches and upward, both plain and neck bolts. Two screws fasten the bolt and bed-plates to the wood; no others are required; the bed-plates are made of brass, from which the spring is cut and raised, upon which the bolt sides with neasy, clastic movement, saving expense of screw and producing a strong, handsome and cheap Bolt. Price list furnished on application.

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Ve also manufacture all kinds of Brass and Tinods, Drop Bases, Thimbles and Roses for Door obs, Plate Excutcheons, Brass Labels, Patent Mirros sinces Cards, &c.

THE BEST HEATERS IN THE WORLD

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st Quality Lace and Strap Leather on Hand, Rivets, Belt Hooks, Dubbing, &c.

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Morse Patent Straight-Lip Increase Twist Drill, Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

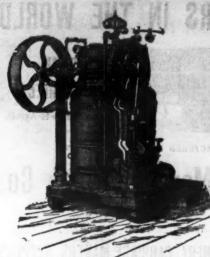
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Compact, Practical, Durable and

Economical. Acknowledged to be the best in use. This boiler

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Stationary Engines and Boilers. Also Machinery for Mills of all kinds and Tanneries. Also their celebrated Hark Mills, acknowledged to be the best.
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Patent Anti-Friction Hoisting Block.

For hoisting Coal, Ore, Ice, or other heavy work, where Steam or Horse power is used. Made of Galvanized Iron and Steel, and not affected by exposure to

Twenty-four feet hoist turns the friction wheels on the sid around once

The Block uses 3 inch to 4 inch rope, and will sustain with safety a load of 4 tons.

Will run either end up, or on its side. The lightest running and most durable Block yet produced.

Satisfaction guaranteed. Try one. Send for Price List of Blocks

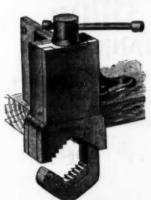




Providence Tool Co.,

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IMPROVED PIPE-FITTERS' VISE.



STRONG. LIGHT. EFFICIENT, CHEAP.



To meet the requirements of the large number of persons who have use for such an article, we invitattention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's Or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of Fittings being near securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Divers, and all who have use for a tool that is strong, light, efficient and cheap which can be readily carried about with kit of tools.

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WARRANTED CAST STEEL

Of every description, including Circular, Shingle, Cross-Cut, Mill, Hand, WOOD SAWS, Etc., Etc.

AMERICAN SAW CO.,

Movable Toothed Circular Saws, PERFORATED CROSS-CUT

The "Ramsay Improved Steam Winder,"

Manufactured by H. A. RAMSAY & CO.,

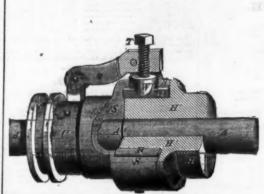
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Expanding, Self-Draining RUBBER BUCKET, Manufactured only by L. M. RUMSEY & CO.



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Manufactured by the HUB FRICTION CLUTCH CO., Limited, Philadelphia.

We claim for this device the following advantages for a perfect clutch, it having been adopted by several of the leading manufacturers of machinery d machinists' tools: It works easily but effectively. It works instantly and without noise. It is very durable, and is extremely simple and cheap, and is proven itself to be the best clutch in the market. Special arrangements can be made with leading manufacturers for the adoption of this clutch for lir own tools. This clutch can and will be sold for less money than any other clutch in the market.

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Better than the best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." Horn of tough untempered steel, never to break or bend. It does not bounce the hammer back, and therefore can do more work with lighter hammer. Only Anvil made in United States fully warranted as above. None genuine without our trade mark

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ANVILS weighing 100 lbs. to 800 lbs., 9 cents per lb., with special SMALLER ANVILS ("MINIMS").

No, 00 0 1 2 3 4 5 6 7 8 9 about 5 10 15 20 30 40 50 60 70 80 colbs.

2 3 4 5 6 7 8 9 colbs.

2 4 5 6 7 8 9 colbs.

3 5 6 7 8 9 colbs.

3 6 7 8 9 colbs.

4 6 7 8 9 colbs.

5 7 8 9 colbs.

6 7 8 0 colbs.

7 8 0 SOLD BY

New York—RUSSELL & ERWIN MANUFACTURING COMPANY, H. DURRIE Philadelphia—JAMES C. HAND & CO. Boston—GEORGE H GRAY Baltimore—W. H. COLE & SONS, JOHN R. KELSO, Jr. Louisville—W. B. BELKNAP & CO. Cincinnati—POST & CO. & CO., TENNIS & WILSON. Cleveland-THE LAKE ERIE IRON CO.

MANUFACTURERS' SUPPLIES. The Best and Lowest Price.



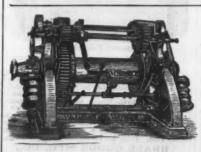
H. A. ROGERS, 19 John Street, New York.

Steam Gauges, Belting, Chucks, Drills, Packing, Governors, Jacks, Oil Cups. STEAM PUMPS for Pumping, Fire Purposes and Boiler Feeding. Also VALVES, PIPING and VISES,





CLARK'S PATENT EXPANSIVE BITS Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other Two sizes: Large Size Boring, % to 3 inches; Small Size Boring, % to 1% inches. WILLIAM A. CLARK, Westville, Conn.



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HUNDLEY & HANKS,

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dooks and Eyes, &c. dis 70&10 f 0's...dis 50&10 g 0's...dis 60&10&10 g



Barnes' Adjustable Pipe Tongs.

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HINGES

Patent Anti-Friction Springs,

SCREEN DOORS.

PRICE LIST.-Per Dozen Pairs.

SINGLE JOINT HINGES. (To Swing one way.)

0,11		WITHOUT ACORN TIPS.		WITH ACORN TIPS.		
	SIZE.	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.	
23/8	inch	\$ 3 00 4 50 7 50	\$ 4 50 6 50 10 00	\$ 5 00 6 75 10 00	\$ 6 50 8 75 12 50	

DOUBLE JOINT HINGES. (To Swing both ways.)

To be used on Door 1 inch thick, or less.

	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
SIZE.	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
23% inch	\$ 6 60 8 30 16 50	\$ 9 00 11 50 21 00	\$11 50 13 50 21 50	\$14 25 17 00 26 00

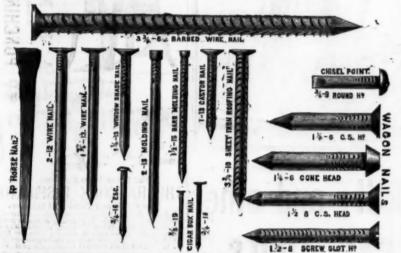
The large cut represents full size of our 5-inch Double Joint Acorn Tip Hinge for mortising.

The small cut represents the plain Single Joint Hinges, but not full size.

Sample pair will be sent by mail on receipt of price.

Liberal Discount to the Trade.

SCOVILL MFG. CO., Nos. 419 & 421 Broome Street NEW YORK.



Of every kind. Roofing and Moulding Nails, Escutcheon Pins, Chair and Caster Nails, Cigar Box and Window Shade Nails, Wagon and Boat Nails,

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Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unqualified guaranty. Office and Factory, 56 to 68 Van Buren St., Chicago.

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STAR LOCK WORKS

Pad Locks, Trunk Stavs. Dead Latches, Keys, &c., &c.



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The Oldest Shot Tower in America.



THOMAS W. SPARKS, SHARKS, SPARKS

American Chilled Shot.

Rivaling the English and all Others. STANDARD DROP & BUCK SHOT AND BAR LEAD.

121 Walnut Street, Philadelphia,

WESTON DYNAMO ELECTRIC MACHINE NICKEL

us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., \$250.

We beg to refer to the following Slove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Cooperative Stove Co., &c. & C. Gurney, Hamilton & Toronto, and many others.

We call attention to infringements of the Weston Machine, in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Flatting Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

J. HARTMAN,

37 & North 7th Street, PHILA.

Monson's Pat. Imp. Well and Cistern Filters. The peculiar construction of the Filter, the exceller qualities of the Lake Shore Gravel, Prepared Charcos and other filtering material used, secures durability and purity. They are adapted for any soil, locality of epth, but especially for the low countries, and particularly for the quicksands, in which they are an entire perfection.



"DRAW CUT" BUTCHERS: MACHINES. Choppers, Hand and Power Stuffers, Lard Presses. Warranted thoroughly made and the BEST IN USE. MURRAY IRAN.

*	BOSTON.
1	Reported by Macomber, Bigelow & Downe, 156 to
-	Anvils, "Eagle American" Boc. dis 28 Apple Parers, Reading & dos 84.00 Lightning & dos 67.00 Reading "12" & dos 7.00 Alkep's Tools & dis 627.00
	164 Oliver St. Anvils,—"Eagle American".
	Stearn's Extension Hollow Augers per dos \$50.00 Bonney's per dos 450.00 Bonney's per dos 33.00 Axes.—Blue Jackets per dos 7.00 Red Cross per dos 7.00 Handled per dos 9.00 Per
	Dowso Boys' dis 15 X
-	Ax Handles Oak Extra, 31 in., No. A
	Wrought " per fi, ½, 3½0; ½, 40; ¾, 40 th, 50 Bird Cannel's Crank Gong dis 40410 Bird Cages, Japanned M. & D., reduced list, 1879. dis 33½ S Brass 1879. dis 425
	Bijiid Fasts,
	Wrought "
	Sanil Augers
	Bracket Saws, extra quality, to No. 4. # gro \$0.75 Steel Frame, with patterns. # doz 7.60 Lester. dis 25 \$ New Rogers, all iron. each, \$2.25 Brackets. dis 2.5 \$
	Bronzed Shefr, M. B. & D. list. dils 10x10 5 Bread Kneader.—Stanyan dils 10x10 5 No. 4 capacity 3 loaves
	New Rogers, all Iron.
	Centonnial Spring. dis 25 to 1 dis 25 to 2
	Cartriages.—U. S. Cartriage Co

A	Amandage Ohane No to
Anvils.—"Eagle American"	American Shear Co.'s Petate Diggers. W. C. & Co. reduced :
Apple Parers.—Reading. # dos 4,50 Lightning. # dos 6,50 Reading '1,28' # dos 7,50 Reading '1,28'	W. C. & Co. reduced ? Putley Blocks Pumps.—Union Manu Iron Cistern.
Aiken's Tgolsdis 40210 %	Pumps.—Union Manu Iron Cistern Pitcher Spout
No. 1. \$4.50; 2. 2.75; 3. 200 each dis 25 \$	
Angurs & Bitts. Snell's Augerdis 50 %	Copper. Rivets.—Black Carriage in to b pap. Copper. Razer Streps.—Tor Rules.—Stanley
Jenning's Bittsdis 16 16 16 16 16 16 16 16 16 16 16 16 16	Carriage in 10 B pape
Cook's Bittsdis so %	Copper Strong Tor
Shepardson's Double-Cut Bitts	RulesStanley
Stearn's Extension Hollow Augersper dos \$30.00	SadironsCommon
Axes.—Blue Jackets per dos 7.50	Sadirens.—Common
Red Crossper doz 7.00	Tailor's Geese. Enterprise, "Potts"
Dowse "Boys'dis 15 %	Enterprise, "Potts" Mrs. Potts' Large Pol Sash Locks,—King & Hopkins & Dickinson
Oak Extra 27 in No. A D dog \$2.25	Donking & Dinkinger
" 34 in., No. A @ dos 2.50	SandpaperBaeder
31 in., No. B	Snah Weights.—Pat
Dowse Boys' dis 15 % Ax Handles.— Oak Extra, 31 in, No. A Boos 2,22 % 1	Sandpaper. Baeder M. B. & D. Sash Weights. Pat Saws. Hand Saws, D Wheeler & Clemson. Cross-Cut Saws. W. M. & C., Common Disston's. Common
Axle Clips	Cross-Cut Saws.
Barn Door Rail	W. M. & C., Common
" Half-Round	
Wrought " per ft, %, 3%0; %, 40; 4, 40	Boynton's Lightnink M. B. & D., Hand Saw W. M. & Co.'s, Circuit Saw Blades, — Disst W. M. & C. Welch & Griffith, Ext
Wrought "Berls, "Connel's Crank Gong	M. B. & D., Hand Saw
Japanned M. B. & D., reduced list, 1879dis 3334 S	W. M. & Co.'s, Circuit
Blind Fasts.—Lock Fasts & C sets \$4.00	Saw Blades Dissto
Blind Fasts. \$\ \circ \cir	Welch & Griffith, Ext
Shedd's	Canton Patrick No.
Blind Hinges.—Mall. Hook, 3 holes P C sets 6.00	ScalesFairbanks
Phoenix Adjustable	Howe. Screws.—Aiken's Fla American Flat-Head
Common dia 75 \$	American Flat-Head
Sorax.—Refined # 5 100	" Round-Head
Eagle Angleeach, \$2.75	Grilley "
Snell Augers # set 1.60	Shares Fimballia
Phoenix Adjustable # dos #2.co Phoenix Adjustable # dos #2.co Phoenix # dis 75	Shaves.—Kimball's Watrous.—American S
Hackus'dis 65 €	Shears American S
Bracket Saws,Roger's each \$2.25 Bracket Saws, extra quality, to No. 4. W gro \$0.75 Steel Frame, with patterns W doz 7.00 Lester. dis 25 %	Shot.—Tatham's Shovels.—O. Ames O. Ames, other branc M. B. & D. Oxford, Birmingham
Steel Frame, with patterns # doz 7.50	O. Ames, other branc
	Oxford, Birmingham
Brackets.	Snow Shovels.—Mal Shates.—Union
Bronzed Shelf, M. R. & D. Hat dis row of	Acme
Bread Kneader.—Stanyandis 25 %	Spoons.—Tinned Iron
New Rogers, all fron each, \$2.25 Brackets, B. & M. Flower Pot dis 50&10 5 Bronzed Sheif, M. B. & D. list dis 10&10 5 Bread Kneader, —Stanyan dis 25 5 No. 4 capacity 3 loaves \$1 doz 2/.00 No. 5	Britannia. Rogers' A No. 1
No. 6 4 8 4	Stock and Dies,-Kl
Butts.—Union Fast Joint	Tacks.—A. Field & So. Fittsfield
" Loose "dis 75/k10 %	Traps.—Oneida, Genu Oneida, Imitation, H.
" Silvered "dis 75&10 %	_Blake's
"Boston Fihishdis 75&10 \$	Tree Scrapers,-No.
Contonnial Spring	No. 2.
Centennial Spring dis 25 % Carriage Jacks.—Climax	Blake's. Tree Scrapers.—No. No. 2. No. 3.
Centennial Spring	Wilder Colded Them The
arriage JacksClimax # doz \$15.00	Wilder Colded Them The
Centonnial Spring	Wilder Colded Them The
Centonnial Spring	Wilder Colded Them The
Ards.	Wilder Colded Them The
Ards.	Wilder Colded Them The
Ards.	Vises.—Solid Box, Blackimpson's Adjustable Howard Vise Co. P. L. & Co., Solid Black Weather Strips. Browne's Flexible Ru In 20 feet boxes; No. 2, % in., 1cc. No. Valentine's Felt Moul Black Walnut Spring. Window Awning.
Ards.	Vises.—Solid Box, Blackimpson's Adjustable Howard Vise Co. P. L. & Co., Solid Black Weather Strips. Browne's Flexible Ru In 20 feet boxes; No. 2, % in., 1cc. No. Valentine's Felt Moul Black Walnut Spring. Window Awning.
Ards.	Vises.—Solid Box, Blackimpson's Adjustable Howard Vise Co. F. L. & Co., Solid Black Vise Co. F. L. & Co., Solid Black Veather Skrips. Browne's Flexible Ruin as feet boxes; No. Valentine's Yelt Mul. Black Walnut Spring Window Awning. Dearborn. Window Springs.
Ards.	Vises.—Solid Box, Blackimpson's Adjustable Howard Vise Co. F. L. & Co., Solid Black Vise Co. F. L. & Co., Solid Black Veather Skrips. Browne's Flexible Ruin as feet boxes; No. Valentine's Yelt Mul. Black Walnut Spring Window Awning. Dearborn. Window Springs.
Ards.	Vises.—Solid Box, Blackimpson's Adjustable Howard Vise Co. F. L. & Co., Solid Black Vise Co. F. L. & Co., Solid Black Veather Skrips. Browne's Flexible Ruin as feet boxes; No. Valentine's Yelt Mul. Black Walnut Spring Window Awning. Dearborn. Window Springs.
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	Vises. Solid Box, Blackingson's Adjustable Howard Vise Co
Ards Sargent Horse and Curry. dis 335&to 5 Cotton. dis 32&to 5 Cotton. dis 32&to 5 Cotton. dis 32&to 5 Cotton. dis 32&to 5 Cotton. dis 22&to 6 Cotton. dis 22	Vises. Solid Box, Blackingson's Adjustable Howard Vise Co

enter's # gross 700 Hart, Bliven & Mead, Framing dis 70 %, Framing dis 25 % ank. Framing dis 25 %	W reinches
Hart Divon & Mand Framing dis so	Wringers.—Universal, No. 2
Framing dis ac dis ac d	Universal, No. 216.
ank, Framingdis 25 %	Novelty, No. 10 # dox 60.00
ine	No. 2 doz 61.00
d Wire, 100 feet each # doz \$4.co	" No. 22 doz 67.00
s.—Ironclad.—Galvanizeddis 25 %	Excelsior, No. A dos 78.00
dia 30 %	NO. B P dox 86.20
Ivetsdis 50 %	Novelty Set Tub P
rass. L. F. & C	Pureka
-manna, usual trade dis Mc W B 11%C	Zine 5'.00
Ale of	Withington, Cooley & Co.—Hoes, Rakes, Porks, Sc.
No. 6 Wire with torrie & dog 60 60	dis socio %. Special rate for Export.
with anap # doz 3.80	
ft. " " with toggle # dog 3.00	The state of the s
ft. " " with snap doz 4.10	O4 Yamin Water Wester
. No. 4 " with toggle ₱ doz 4.50	St. Louis metal market.
with snap P doz 4.75	(Corrected Waskly by Messra, R. Selless & Co.)
It. 3 with toggle P dog 5.38	The Place.
Tt. With snap b doz 5.62	IC. 10x14. Best Char 17 95 DX. 194cv17 B. Char 4
Pointed Steel	1X 10x14. " 026 DXX 125cx17 " 11 05
Pocket American Shear Co 's die of	IC, 12x12, " 7:26 DXXX, 1214x17 18 25
nives, "Woods," Lan Bolston	(X, 12x12, " 9.25 DXXXX, 1, 6cx17, 15.25
landledis 2216 %	IC, 14x20, " 725 IC, 20x28, " 17:40
vesdis 20 %	IX 14x20, " 9'25 IX 20x38, " 21.50
ter, Oval Handledis 25 %	1XX, 14X30, " 11 25 1XX, 20x28, " 21:50
dis 3355 %	1X.X.X., 14X20, B. Char. 18'45 IC, 14X20, Best Roof 175
dis 3314 %	IC 1924 " 18 16 20000 " . 375
mmon Round Handle, "Woods"dis 25%	IV 157 4 " 0 90 1 1 91 90 6 " 13 73
Cooking	10: 14x14 " 18.25 IC 10x14 Bost Coke" 17 (5)
-Cook sdis 25 %	[A. 14x14. " 15°75 [C 14x30. " 4.0
zlew.—Automatic dia re s	IXX, 14x14, " 18 25 1 (C. 10x20, " 425
ngsTorrey's Rod # dog \$1.75	DU, 1256x17, " 7:25 Pr box 225 sh's Safe Tin 6:50
dis 10 %	BLU D. kera Junia
Steel Coll Spring, No. 1 # dos \$2.75	Sheet Iren. Com n. Sm'th. Sm'th.
P doz \$1.25	No. 16 to 30
₩ dos #2.25	80. 22 to 24
m.— Thurston's	No. 97 3 3 300 4 0 6 7 7 6
ree Bitt Stock	Constant Press
light Shank die an C	Perfect-No. 9, 10, 11, 12, per in 181-c
Zollington Mills 30 % 100	No. 1 Stained-No. 9, 50, 11, 12 Ber 10, 13 o
P & So	Tare 22 lbs. to Balo. For less than Bale. add 1c. & b.
Ware.	Patent Planished Iron
Mfg. Co. Kettlesdia 60 %	No. 21 to 27, A quanty
Sauce Pansdis 40 %	For less than Bdle. add ic. per lb.
tesWrought B 70	for less than build, and ic. per it.
Mfg. Co. Kettles dis 60 % sauce Pans dis 40 % ess.—Wrought * <t< th=""><th>Wringers.—Universal, No. 2</th></t<>	Wringers.—Universal, No. 2
File Codis 40 %	Block Tin.
nohimes 35 %	Block Tin, Banca, Large Figs21c do. Smail
h 6 inch rolls	Straits, Large Pigs 17c Bar 19c
W dox 13.50	Eng. Ref'd, Large Pig17c
dea & Cockayne	Extra in Bars
" W dos 24.00	Extra in Bars
	No. 1, 1u " 10c Spelter Solder 240

.each # 8.00

Grub Hoes.—K. P. & Co.'s No. 2...... Hammers.—Maydole's.....

Hangers & Rollers,—Anti-Friction... Climax... Novelty...

Hurricane Lawn Mowers.—"Charter Oak

Dowse's Steel, A. E.... M. B. & D....

P dos 5.38	(Corrected Weekly by Mesars. R. Selleto & Go.)
ID GOZ 5.02	The Plate (G. 1924) Best Char . 37 25 DX, 125 x17, B. Char . 4 IX, 19214 DX, 125 x17, B. Char . 4 IX, 19214 DX, 125 x17 1 25 IX, 125 x17 1 25 IX, 125 x12 DX, X, X, 125 x17 1 25 IX, 125 x18 1 25 IX, 125 x18 1 25 x18
	IC, 10x14, Best Char., 1725 DX, 134x17, B. Char.
Co.'sdis 40 %	10 19v19 " " " DYYY 1910-17" 11 23
CO. 8dls 40 %	(X 12712. " 9:51 DXXXX 1 16717 " 18 25
Bolster, dis 3314 %	IC. 14x20. " 7:25 IC. 20x20. " 17:40
dis 3373 %	IX, 14x30, " 9'25 IX, 20x38, " 21.50
dia 25 %	[XX, 14x30, " 11 25 [1XX, 20x28, " 21:50]
dis 3316 %	1XXX, 14x20, B. Char. 18'45 IC, 14x20, Best Roof '75
dis 3314 %	IXXXX, 14x30 15.25 IX, 14x30, 975
Woods "dis 25%	10, 12x24, 15. 10, 20x28 13 73
dis 3314 % dis 3314 % Woods ''dis 25% dis 10 %	18 95 1 IC 10v14 House Cole 17 15
	13. 14x14. " 15°56 1C 14x20. " 4.0
dia re s	IXX, 14x14, " 18 25 1 1C, 10x20, " " " " 925
TH CON MY.75	DU, 1256x17, " . 7:25 Pr box 215 sh's Sufe Tin 6:50
dis 20 % dis 15 % dis 15 % dis 10 %	Sheet Iran. Comp. Sm'ta. km'th death
₩ dos \$2.75 ₩ dos \$1.25 ₩ dos \$2.25	Sheet Iren. Com n. Sm'ta. Sm'th. Sm'th
P doz \$1.25	No. 16 to 30
W dos #2.25	BO 25 TO 34
dis 50 %	No. 97 3 340 4 6 630 24
dis 25 %	Constan Maurin Iron.
dis 20 %	Perfect-No. 9, 10, 11, 12 per in, 181-c
# # 100	No. 1 Stained-No. 9, 10, 11, 12 Ber 10, 13 0
# B 6c	Tare zz lbs. to Bolo. For less than Bale. add 1c. w b.
	Patent Planished Iron
dis 60 %	Sheef From Column Smith
dis 40 %	For less than Bdlg. add ic. per lb.
dis 35 %	Juniata, or lat quality, Discount for full bundles45 \$
dis 40 %	Block Tin.
	Banca, Large Pigs ?1c do. Smail
# doz #36.00 # doz 13.50 # doz 12.00	Block Tin Banca, Large Pigs Stc do. Bmail 180 Straits, Large Pigs 170 Bar 190 Eng. Ref'd, Large Pig. 170
# dox 13.50	Eng. Rerd, Large Figtic [
# doz 12.00	Extra in Bars 120 I No. 2 In Bass 01/0
P doz 24.00	No. 1. 1u " ioc Spelter Solder
dis 50&10 %	Pig Lond -Pigs4c in Bars
	Antimony
8-32, \$1.00; dos gold.	Solder S
v doz gold.	dismething -Dishn's
	Robbit Metal.
nife Sharp-	Babbit Metal. No. 1
# doz #1.00	" 2 " 14c " 4 " 75cc
dis 15 %	Capper: Branters, 50x80, 14 to 100 lbs. Sheets 240
die 20 %	Bragier's, morec, 14 to 100 lbs. Secots
	44 6 and 0 the 44
ondis coatro %	44 44 6 and 7 lbs. 44
3 dis 60& 10 %	Tinned, 14x48, 14 and 16 oz
dis 50&10 %	Pranished, 14x48, 14 and 16 oz
dis 40 %	Tinned, 14148, 14 and 16 oz
dis 20 %	Gutter Copper, 20 and 24x72, 10, 11 and 12 h, Sheets9, 2fc
	14 b. sheets24c
per doz., \$10.00 dis 30 % 	Bay Copper Square and Round, & to 14 (neb.
dis 30 %	Bar Copper, Equate and House, A to 1% Inch 240
@ dox \$18.00	Copper Bottome
dis 60&10	
W D 40	Boldering Coppers
# 10 40 # 10 40	Mrn no. 10 to 00 10 to to -14th
dis 40 %	Roll, No. 10 to 28, 12 in. in width
8 0	64 82 16 64 29a
8 9 20 .19dis 25 %	** \$2, 16 **
20 .10 10 % 1	# 36, 16 #
dis 25 %	Platers, No. 40, 6
No. 9, 19.	
W doz \$0.65	Brass Copper Wire.
W dog .85	No. 0 to 2028c Sic No. 24 250 400
# doz 2.50	" 21
	" 22 820 4/6 " 26 400 500
B dog 6.00	Brass and Copper Wire, Brass Copper

ĸ.	14 M. Sheets	24
П	Reservoir Copper, 16 m. Sheets. Reservoir Copper, 16 m. Sheets. Rar Copper, Square and Round, 3 to 13 Inch. Square and Round, 3 to 13 Inch. Metallic Bottoms.	130
0	Har Copper Square and Round, & to 14 fach	94
6	Bar Copper, Equare and House, M to 1% men	***** 48
0	Claim on Bostone	6 61
	Copper Bottome	
·	Metallic Bottoms	160
3	Boldering Coppers	**********
ш	MYBEE.	
1	Roll, No. 10 to 28, 12 in. in width	250
ч	30, 12 in. in width	26
Л	** \$2, 16 **	394
Я	* 84, 16 ** ********************************	Bdt
Н	Roll, No. 10 to 28, 12 in. in width	B44
и	Platers, No. 40, 6 "	404
1	Platers, No. 40, 6 Discount 10 per cent.	1.000 000
٦		
١	Brass. Copper. No. 0 to 2028c 8 to No. 24 85c 12 12 12 13 15 15 15 15 15 15 15 15 15 15 15 15 15	Copper
ŧΙ	No 040 20 280 Sic No. 24 250	achbet
ŝΙ	** 21	400
ü	4 100 990 4/0 4 96 400	
ч	4 101 1000 400 44 47	500
а	20	586
з	Brass Boring Wire, 2c. W b advance, Discount 10 per cent.	
31	Discount to ber cent.	
31	Brass Tubing	
П	Plain 16 to 3 inch S8c 5-16 inch	
Н	% inch	68c
1	Copper Mivets and Burs	. dán bit u
. 1	Bruss & ettles 8 to 13 inches	P 30 30c.
1	all sizes over 18 inches	** 40c
1	Sheet Zine, -000 ibs. cask	. " 70
1	250 lbs. cask	" 734 C
1	Sheet	720
1	Wire,-iron, Bright Market	. din 55 %
1	Iron, Coppered Market	dia 10 %
1	Fence, Nos. 7, 8 and 9	3.04o
1	Trellia Nos. 10 and 11	4. 4340
1	4 No. 14	2 0
1	Plain 1/4 to 3 inch. Sec 1 5-16 inch. Sec 1/5 inches. Se	St 3 6
1	" No. 12	F140
1	Broom, Tinned, Nos. 18 to 22	Long
1	Fonce Stanics per	TOP A
1	Par In	540
1	From Blwets,-Black, papered	di un a
1	Tinned panered	OI 1200 4
1	To palk new 2-16 4 5-16 a	in dias
1	280 700 600	m.dia L
1	Manira New Hardware List	MIN TO
4	THE MAN PROPERTY AND ADDRESS OF THE PARTY AND	G10 20 %
1	Manager Manager - Standard Man Co.	h maxc
з	Minimoton Messens Dennuara Mill. Co	. CLEB GIV S
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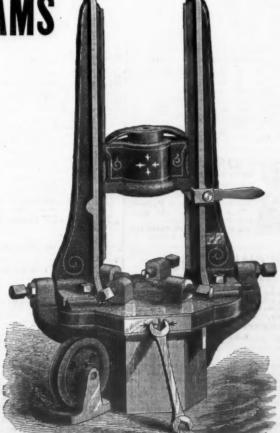


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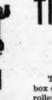
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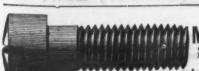
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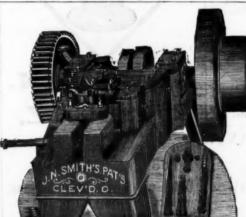
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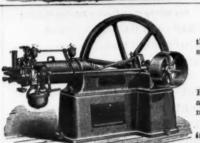
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